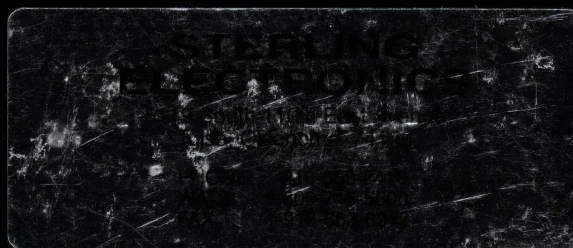


MICRO SWITCH
Sensing and Control

May 1995

Basic Switches

Catalog 10



Turning Technology Into Switching Solutions

Call our Customer Response Center

1-800-537-6945

Selection

Miniature/
Subminiature

Standard
Basic Switches

Sealed/High
Temperature

Door Switches

Reference/Index

About This Catalog

CATALOG SCOPE

The products described in the following pages are representative of the thousands of basic switches manufactured and distributed worldwide by Honeywell MICRO SWITCH Division. Most of the catalog listings given are preferred listing and normally will be off-the-shelf-delivery.

USING THE CATALOG

This Catalog is easy to use. It allows a user familiar with our products to quickly locate the exact page the needed product catalog listing is on. For those unfamiliar with MICRO SWITCH products, selection guides help the user pick the appropriate product for their application need.

By taking a few minutes to familiarize yourself with the catalog organization you will find it very easy to quickly locate the product you need.

REFERENCE DATA

Need Operating Characteristics and Terminology Explained—(See page 94)

Definitions of terms will familiarize you with terminology used throughout the catalog—(See page 98).

For complete electrical ratings see the electrical rating charts given on the first product group page. B type switch performance is on pages 96-97.

SOLDERING

For information on soldering to switch terminals request "Data Sheet 200".

MOUNTING DIMENSIONS

Mounting dimensions are shown at the end of each product section in English and metric equivalents. These dimensions are for reference only. For exacting layout work, request an engineering drawing.

NOTE: Before placing an order, please check the date on the front of this catalog. If it's more than a year old, we may have a more up-to-date catalog available.

To assure you have the latest information on our product offering, call the MICRO SWITCH Application Center at 1-800-537-6945. They can tell you if your catalog is current, and they'll be happy to send you a new one if it's not. They'll also help immediately to confirm the validity of the product listing you'd like to order.

SELECTION

On page 1 you can see representative products found in the catalog. The Table of Contents directs users to the main parts of the catalog.

1. If you have a catalog listing use the alphanumeric index/page number starting on page 102.

Example: BZ-2RQ-A2

| | |
|----------------------|----|
| BZ-2RL24-A2 | 55 |
| BZ-2RL5551-A2 | 55 |
| BZ-2RL25551-A2 | 55 |
| BZ-2RLT04 | 55 |
| BZ-2RM-A2 | 52 |
| BZ-2RN702 | 51 |
| BZ-2RQ-A2 | 51 |
| BZ-2RQ1-A2 | 51 |
| BZ-2RQ1T04 | 51 |

2. If you know the type of switch you're looking for use the Index by Product type page 3 to find the page number.

Example: V3 Miniature switches

Miniature and subminiature basic switches

| | |
|--|----|
| US Subminiature basic switches | 8 |
| UX Subminiature basic switches | 10 |
| UM Subminiature basic switches | 12 |
| Electrical ratings/UL codes | 20 |
| SX Subminiature basic switches | 21 |
| SM Subminiature basic switches | 26 |
| V3 Miniature basic switches | 32 |
| V7 Miniature basic switches | 38 |
| TB Miniature double-break basic switches | 44 |

3. If you're not familiar with the product or need more information, a detailed selection guide begins on page 4. Here photos for each product type and important selection factors are given to help determine and select the best product for the application. They include:

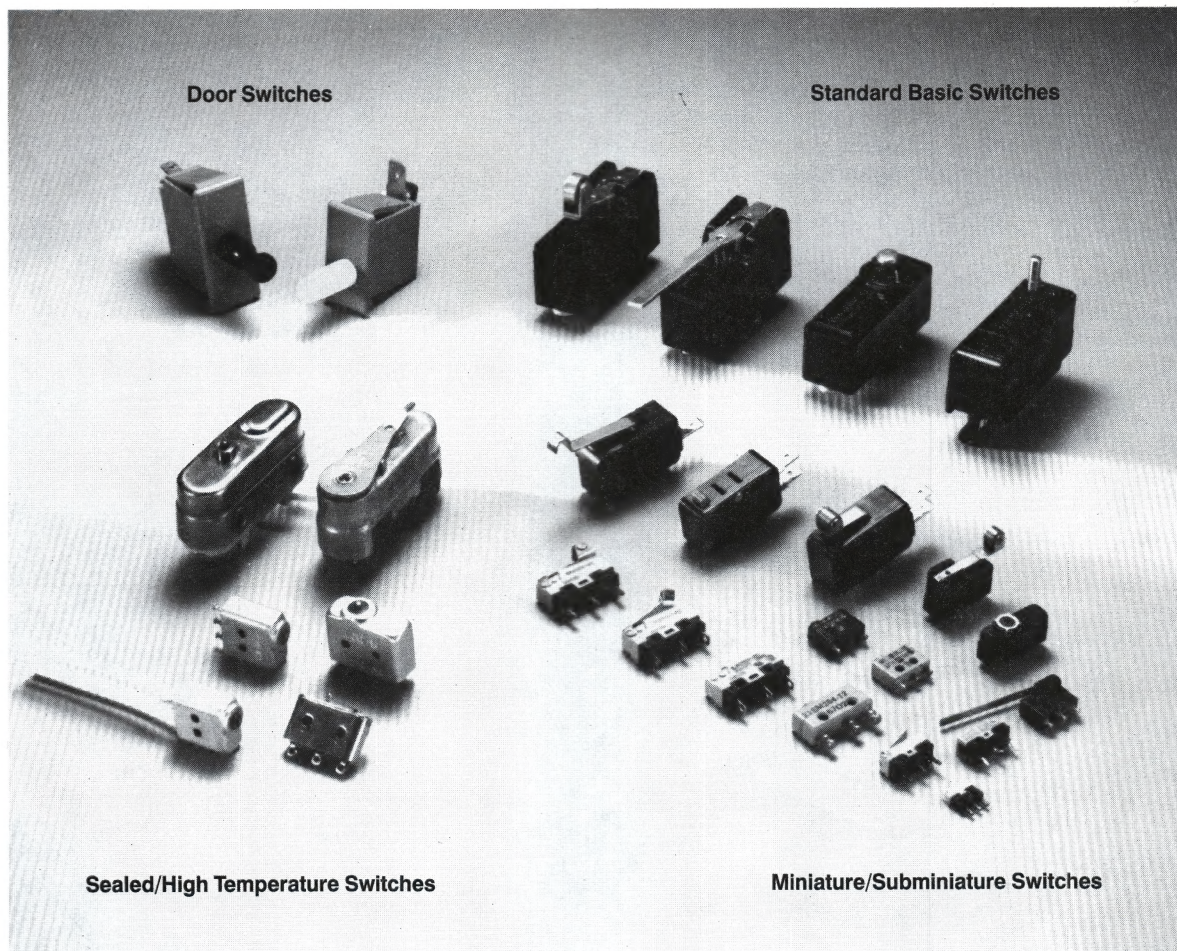
- Physical description—size, actuation, mounting, etc.
- Characteristics—force, travel, sensing range, etc.
- Electrical parameters—ratings, supply, output, etc.
- Environment/sealing
- Agency listings
- Special features

4. If you need additional information.

For technical questions, application assistance, pricing, delivery, or the name of your local authorized distributor or sales office, call 1-800-537-6945.

In many cases more than one product may work. For the most cost-effective solution, compare prices and consider alternatives. Remember end cost includes initial product price, plus installation, plus service.

Basic Switches



SUBMINIATURE/MINIATURE BASIC SWITCHES

The U Series of subminiature basic switches are our newest line. The US is the smallest snap-action switch available. The UX and UM are versatile, low cost, full featured products with ample electrical capacity in a compact package. SM subminiature basic switches are a versatile collection of small size and ample electrical capacities, including 11 amp power load handling and ¼ hp motor load. SX subminiature basic switches are smaller than SM switches, yet are big in performance and selection. They provide up to 7 amp power load capacity. V3 miniature basic switches put a 25 amp power load capacity and a choice of 11 other electrical ratings into a relatively small package with many choices of actuators, contact materials, and terminal designs. V7 miniature basic switches have electrical ratings up to 15 amps. Both commercial and European versions are UL recognized and CSA certified. The latter is also designed to meet all leading European approval agency requirements. TB miniature basic small double-break units can control 2, 3 or 4 isolated circuits.

STANDARD BASIC SWITCHES

Power load switching and motor handling capacity are among the attractions of thumb-size BZ/BA standard basic switches. Double-pole double-throw switching is added by DT switches. Where there's a need for reliable switching of high capacity systems involving DC motors and solenoids, MT magnetic blow-out switches do the job. The 3MN has double-break switching. 6AS assemblies have two tandem mounted standard basic switches under a common actuator.

SEALED AND HIGH TEMPERATURE BASIC SWITCHES

Specially adapted basic switches include: SE/XE environment-proof switches which protect subminiature SM/SX basic switches within a sealed housing; HM hermetically sealed switches are interchangeable in operating point with the SM switches; HS hermetically sealed switches which parallel the size and mounting scheme of the standard basic switches; and HT high temperature switches for use up to +1000°F.

DOOR SWITCHES

AC, WW and DM switches automatically cut power when a service door or drawer is opened.

For application help: call 1-800-537-6945.

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| Typical Applications | p. 2 |
| Index by Product Type | p. 3 |
| Selection Guides | p. 4 to 7 |
| Catalog Listings/Order Guides | p. 8 to 93 |
| Reference Data | p. 94 |
| Catalog Listing/Page Number Index | p. 102 |

Basic Switches

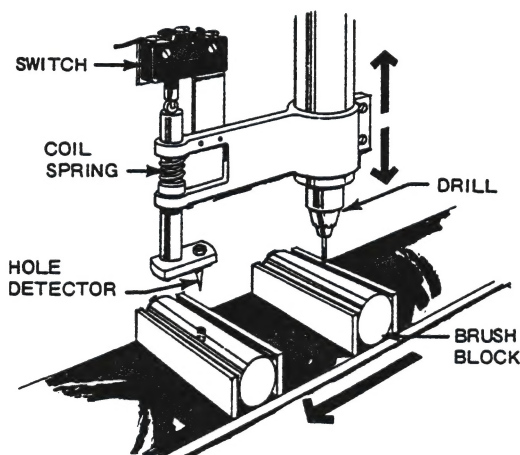
Typical Applications

Basic switches are the first consideration for simple or precision on/off application needs. There are many variations/choices of size, actuation, termination and operating characteristics. Use the selection guide to compare and evaluate products.

Typical Applications

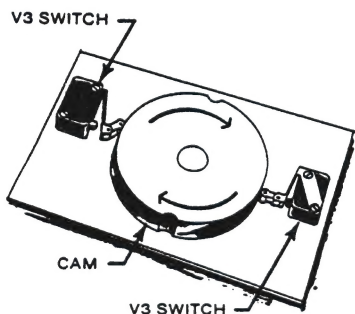
- Appliances
- Vending machines
- Timing devices
- Office equipment
- Computer/business equipment
- Test instruments
- Medical/dental equipment
- Communications equipments
- HVAC equipment
- Manually operated devices

Broken Drill Detection



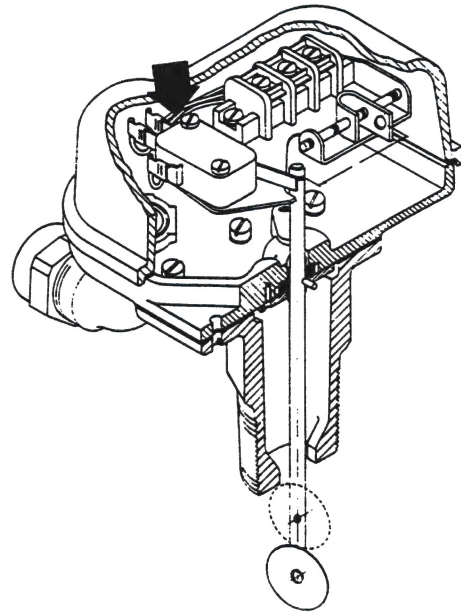
In making a hair brush, holes are drilled in the brush block and then it is transferred to a filling station where bristles are inserted and stapled to the block. Since these machines run at up to 300 strokes a minute, a broken drill and the lack of a hole can cause serious damage. A spring-loaded probe follows the drill and if there is no hole for the probe to enter, a shaft rises to operate a BZ switch and shut off the machine.

DC Drive Motor Direction

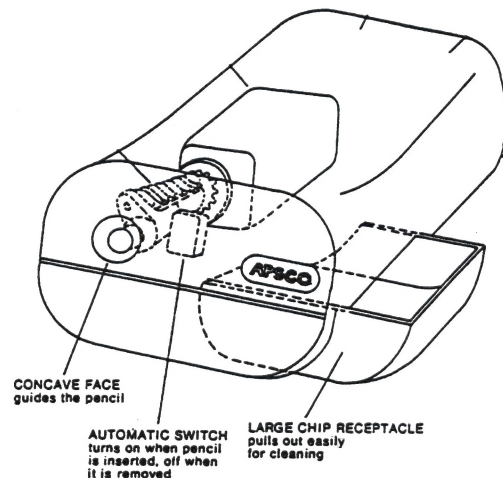


Registering which way a two directional DC drive is turning is no trick with a simple device using two V3 snap-action switches with JV-30 one-way action auxiliary actuators. A zero-center potentiometer controls the speed of the drive. When the cam is rotated, one switch is held actuated while the other switch is not. Turning the cam in the opposite direction, the "closed" switch stays "closed" until the control is returned to the zero position and both switches are open.

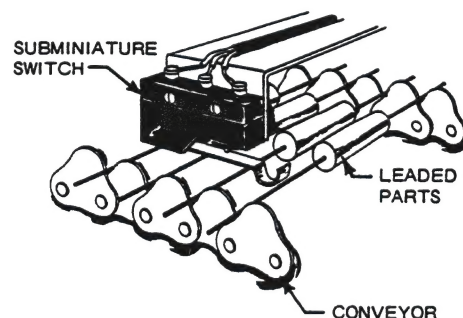
Fluid Flow Switch



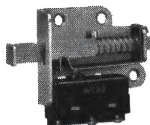
Pencil Sharpener On/Off



Component Taping Machine



To detect missing parts on a sequential electronic component taping machine, a low force SM switch is placed so that the wire leads actuate the switch lever as they move along the conveyor chain. The machine control unit is programmed to stop the machine if a vacant space is encountered. The operator adds the part, pushes a button which overrides the switch and the operation resumes.



Index by Product Type

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| SM Subminiature basic switches | 26 |
| V3 Miniature basic switches | 32 |
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| BZ/BA Test Program | 96 |
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| Other MICRO SWITCH products | 99 |
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UM
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SX
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SM
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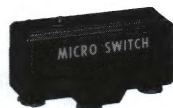
V3/V7
Page 32

| | SUBMINIATURE | | | | | MINIATURE | |
|--|------------------------------|------------------------|---------------------------|--------------------------------|--------------------------------|--------------------------------|------------------------|
| | US | UX | UM | SX | SM | V3 | V7 |
| PHYSICAL DESCRIPTION | | | | | | | |
| Package Size (inches) | .177H .098W .295L | .197H .236W .50L | .43H .25W .78L | .35H .20W .50L | .49H .25W .78L | .63H .40W 1.09L | .63H .40W 1.09L |
| Actuators | Pin or integral levers | Pin or levers | Pin or levers | Pin, leaf or levers | Pin, leaf or levers | Pin, leaf or levers | Pin, leaf or levers |
| Mounting Centers (inches) | .158 | .256 | .38 | .19 | .38 | .88 | .88 |
| CHARACTERISTICS | | | | | | | |
| Electrical Data (Maximum available) | .5A- 30 VDC | 3A- 125 VAC | 5A- 30 VDC, 250 VAC | 7A- 28 VDC, 250 VAC | 11A- 125, 250 VAC | 25A 125, 250 VAC | 15.1A 125, 250 VAC |
| Low Energy (Gold) Circuitry | .1A SPDT | .1A SPDT | .1A SPDT | 2 mA SPDT | .1A SPDT | 1A SPDT | .1A SPDT |
| Minimum Operating Force | 25g. | 25g. | 8g. | 2g. | 6g. | 15g. | 15g. |
| Minimum Differential Travel (inches) | .004 | .005 | .004 | .001 max. | .001 max. | .002 max. | .002 max. |
| ENVIRONMENT | | | | | | | |
| Std. Temperature Range (°F) | 176° -13° | 185° -13° | 185° -13° | 400° F 250° -65° | 400° F 180° -65° | 400° F 180° -65° | 180° -40° |
| Housing Material | Thermoplastic | Thermoplastic | Thermoplastic | General purpose phenolic | General purpose phenolic | General purpose phenolic | Polyester |
| APPROVAL Agency Recognized Agency Certified | | UL CSA | VDE UL CSA SEMKO | UL CSA MIL-S-8805 | UL CSA MIL-S-8805 | UL CSA MIL-S-8805 | UL CSA VDE |

* Other temperature ranges available

Basic Switches

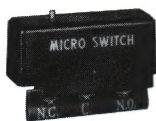
Standard



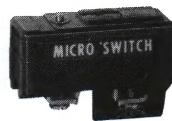
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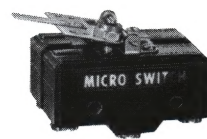
DT
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MT
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3MN
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6AS
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Selection

| | | | | | |
|--|--|--|---|---|---|
| .95H .69W 1.94L Pin, integral or auxiliary leaf and lever, overtravel plunger 1 | .95H .69W 1.94L Pin, integral or auxiliary leaf and lever, overtravel plunger 1 | 1.28H .69W 1.94L Pin, integral or auxiliary lever 1 | 1.30H .69W 1.94L Pin, integral or auxiliary leaf or lever 1 | 1.20H .68W 2.50L Pin 2.13 | .93 1.38W 1.94L Integral leaf or lever 1 |
| 15A-22A 125, 250, 480 VAC ½ A 125VDC SPDT Specials 1 oz. .0002 | 20A-25A 125, 250, 480 VAC SPDT 2.5 oz. .002 | 10A- 125, 250 VAC DPDT 3.5 oz. .020 | 10A- 125 VAC or VDC SPDT 2 oz. .004 | 15A-125, 240, 480, 600 VAC 2 CKT DB 7 oz. .015 | 15A- 125, 250, 480 VAC SPDT 2 CKT DB 8 oz. .109 |
| 180° -65° Neoprene or Elastomer sealed plunger General purpose phenolic | 180° -65° General purpose phenolic | 180° — General purpose phenolic | 180° — Arc resistant melamine | 180° — General purpose phenolic | 180° — General purpose phenolic |
| UL CSA MIL-S-8805 | UL CSA MIL-S-8805 | UL CSA MIL-S-8805 | UL | UL CSA | UL |

Basic Switches

Sealed and High-Temperature

Product Selection Guide



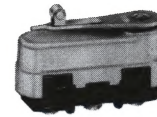
XE
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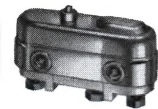
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HM
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HS
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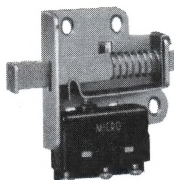
HT
Page 87

| | | | | | | |
|---|--|--|--------------------------------|---|------------------------|--------------------------|
| PHYSICAL DESCRIPTION | | | | | | |
| Package Size (inches) | | .75H .32W .62L | .75H .34W .88L | .72H .25W .79L | 1.18H .67W 1.96L | 1.25H .70W 1.96L |
| Actuators | | Pin, auxiliary leaf | Pin, auxiliary leaf or lever | Integral lever, auxiliary leaf or lever | Integral lever | Pin, over-travel plunger |
| Mounting Centers (inches) | | .19 | .38 | .37 | 1 | 1 |
| CHARACTERISTICS | | | | | | |
| Electrical Data (Maximum available) | | 7A- 28 VDC, 115, 250 VAC | 5A- 28 VDC, 125, 250 VAC | 4A- 28 VDC 115 VAC, 600 Hz | 25A- 28 VDC | 3A- 125, 250 VAC |
| Circuitry | | SPST SPDT | SPST SPDT | SPDT | SPDT | SPDT |
| Minimum Operating Force | | 4 oz. | 4 oz. | 1.5 oz. | 4 oz. | 10 oz. |
| Minimum Differential Travel (inches) | | .005 max. | .004 max. | .006 max. | .020 | |
| ENVIRONMENT | | | | | | |
| Temperature Range (°F)* | | Upper 230° Lower — | 221° — | 250° —85° | 180° —67° | 1000° — |
| Sealing | | Environment | Environment | Hermetic | Hermetic | |
| Housing Material | | Aluminum | Aluminum | Stainless steel | Monel | Stainless steel or monel |
| APPROVAL | | | | | | |
| Agency Recognized | | UL | UL | | UL | UL |
| Agency Certified | | CSA MIL-S-8805 | CSA MIL-S-8805 | MIL-S-8805 | CSA MIL-S-8805 | CSA |

*Other temperature ranges available.

Basic Switches

Door



AC
Page 89



DM/DP
Page 90



WW
Page 92

| | | |
|---|---|---|
| Varied | 1.25 or 1.6H .68W 1.95L | 1.93H .54W 1.58L |
| Rod | Plunger | Plunger |
| Varied | Snap-in mount | Snap-in mount |
| 5A-15A 125, 250, 480 VAC 2 SPDT 4 SPDT — — | 10A, 125, 250, 277 VAC 16A, 125, 250, 277 VAC SPDT DPDT 15 oz. — | 16A, 125 250 VAC 1, 2 or 3 CKT 15 oz. |
| 180° —65° Version with SE basic switch Stainless steel bracket, stainless steel or polyester rod | 180° —35° — Polyester | 185° —40° — Polyester |
| Some are MIL-qualified | UL CSA | UL CSA |

Basic Switches

Subminiature

US Series



PC Terminal Version



FEATURES

- MICRO SWITCH'S smallest snap-action switch
- Choice of low energy or power duty electrical ratings
- Variety of integral actuators
- Temperature Range: -25° to $+80^{\circ}\text{C}$ (-13° to $+176^{\circ}\text{F}$)
- Weight: 0.2 grams (.007 oz.) – PC terminal type
0.3 grams (.011 oz.) – solder terminal type
- Form C single-pole double-throw (SPDT) circuitry

ELECTRICAL RATINGS

| Voltage | Resistive Load Gold Contacts US10 Type | Silver Contacts US20 Type |
|-------------------|--|------------------------------|
| 30 VDC 125 VAC | 0.1 A 0.1 A | 0.5 A 0.1 A |

ORDER GUIDE SOLDER TERMINALS

| Contact Type | Actuator | O.F. max. grams oz. | Solder | R.F. min. g ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|---------------------|---------------------------------|---------------------------|------------|--------------------------|---------------------------|---------------------------|---------------------------|-----------------------------------|
| Gold, 0.1 Amp | A pin plunger | 100 3.527 | US10D10A00 | 10 .353 | 0,3 .012 | 0,1 .004 | 0,1 .004 | 5,4 \pm 0,15 .213 \pm .006 |
| | C flat lever | 25 .88 | US10D10C00 | 2,0 .071 | 2,4 .094 | 0,4 .016 | 0,7 .028 | 6,4 \pm 0,6 .252 \pm .024 |
| | E simulated roller lever | 30 1.058 | US10D10E00 | 2,0 .071 | 2,2 .087 | 0,3 .012 | 0,7 .028 | 6,7 \pm 0,5 .264 \pm .020 |
| Silver, 0.5 Amp | A pin plunger | 100 3.527 | US20D10A00 | 10 .353 | 0,3 .012 | 0,1 .004 | 0,1 .004 | 5,4 \pm 0,15 .213 \pm .006 |
| | C flat lever | 25 .88 | US20D10C00 | 2,0 .071 | 2,4 .094 | 0,4 .016 | 0,7 .028 | 6,4 \pm 0,6 .252 \pm .024 |
| | E simulated roller lever | 30 1.058 | US20D10E00 | 2,0 .071 | 2,2 .087 | 0,3 .012 | 0,7 .028 | 6,7 \pm 0,5 .264 \pm .020 |

ORDER GUIDE PC STRAIGHT TERMINALS

| Contact Type | Actuator | O.F. max. grams oz. | PC Straight Cross-Line | R.F. min. g ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|---------------------|---------------------------------|---------------------------|------------------------------|--------------------------|---------------------------|---------------------------|---------------------------|-----------------------------------|
| Gold, 0.1 Amp | A pin plunger | 100 3.527 | US10D20A00 | 10 .353 | 0,3 .012 | 0,1 .004 | 0,1 .004 | 4,8 \pm 0,15 .189 \pm .006 |
| | C flat lever | 25 .88 | US10D20C00 | 1,0 .035 | 2,4 .094 | 0,4 .016 | 0,7 .028 | 5,8 \pm 0,7 .228 \pm .028 |
| | E simulated roller lever | 30 1.058 | US10D20E00 | 1,0 .035 | 2,2 .087 | 0,3 .012 | 0,7 .028 | 6,1 \pm 0,7 .240 \pm .028 |
| Silver, 0.5 Amp | A pin plunger | 100 3.527 | US20D20A00 | 10 .353 | 0,3 .012 | 0,1 .004 | 0,1 .004 | 4,8 \pm 0,15 .189 \pm .006 |
| | C flat lever | 25 .88 | US20D20C00 | 1,0 .035 | 2,4 .094 | 0,4 .016 | 0,7 .028 | 5,8 \pm 0,7 .228 \pm .028 |
| | E simulated roller lever | 30 1.058 | US20D20E00 | 1,0 .035 | 2,2 .087 | 0,3 .012 | 0,7 .028 | 6,1 \pm 0,7 .240 \pm .028 |

OTHER TERMINATION TYPES ARE AVAILABLE

For PC right angle, change 2nd set of numbers to 50 (Example: US10D**50**A00)

For PC left angle, change 2nd set of numbers to 60 (Example: US10D**60**A00)

Basic Switches

Subminiature

UX Series



FEATURES













- Compact size – helps minimize equipment size
- Choice of low energy or power duty electrical ratings
- Variety of integral actuators
- Temperature Range: -25° to +85°C (-13 to 185°F)
- Weight: 0.5 grams (.018 oz.)
- UL/CSA marking designations
- Form C single-pole double-throw (SPDT) circuitry

ELECTRICAL RATINGS (in amps)

| Voltage | Silver Contacts | | Gold Contacts UX10 Type |
|----------|-----------------|-----------|----------------------------|
| | UX40 Type | UX30 Type | |
| 125 VAC* | 3 A | 1 A | 0.1 A |
| 30 VDC | 2 A | 1 A | 0.1 A |
| 6 VDC | – | – | 5 mA |
| 12 VDC | – | – | 2 mA |
| 24 VDC | – | – | 1 mA |

*UL/CSA rating. UL File No. E12252. UL Standard 1054.CSA file LR23413M167

ORDER GUIDE

| Rating | Actuator | O.F. max. grams oz. | Terminals | | R.F. min. g ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|--|---|---------------------------|------------|------------------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|
| | | | Solder | PC Straight Self- Supporting | | | | | |
| Gold, 0.1 Amp 125 VAC  | A pin plunger  | 75 2.65 | UX10C10A01 | UX10C30A01 | 10 .353 | 0,5 .020 | 0,25 .010 | 0,12 .005 | 5,5 ± 0,2 .217 ± .008 |
| | | 150 5.3 | UX10E10A01 | UX10E30A01 | 20 .705 | 0,5 .020 | 0,25 .010 | 0,12 .005 | 5,5 ± 0,2 .217 ± .008 |
| | C flat lever  | 25 .88 | UX10C10C01 | UX10C30C01 | 2,5 .088 | 2,1 .083 | 0,55 .022 | 0,50 .020 | 6,8 ± 1,0 .268 ± .039 |
| | | 50 1.76 | UX10E10C01 | UX10E30C01 | 5,0 .176 | 2,1 .083 | 0,55 .022 | 0,50 .020 | 6,8 ± 1,0 .268 ± .039 |
| | E roller lever simulated  | 27 .95 | UX10C10E01 | UX10C30E01 | 2,0 .071 | 2,1 .083 | 0,50 .020 | 0,50 .020 | 9,5 ± 1,0 .374 ± .039 |
| | | 55 1.94 | UX10E10E01 | UX10E30E01 | 4,0 .141 | 2,1 .083 | 0,50 .020 | 0,50 .020 | 9,5 ± 1,0 .374 ± .039 |
| Silver, 1 Amp 125 VAC  | A pin plunger  | 75 2.65 | UX30C10A01 | UX30C30A01 | 10 .353 | 0,5 .020 | 0,25 .010 | 0,12 .005 | 5,5 ± 0,2 .217 ± .008 |
| | C flat lever  | 25 .88 | UX30C10C01 | UX30C30C01 | 2,5 .088 | 2,1 .083 | 0,55 .022 | 0,50 .020 | 6,8 ± 1,0 .268 ± .039 |
| | E roller lever simulated  | 27 .95 | UX30C10E01 | UX30C30E01 | 2,0 .071 | 2,1 .083 | 0,50 .020 | 0,50 .020 | 9,5 ± 1,0 .374 ± .039 |
| Silver, 3 Amp 125 VAC  | A pin plunger  | 150 5.3 | UX40E10A01 | UX40E30A01 | 20 .705 | 0,5 .020 | 0,25 .010 | 0,12 .005 | 5,5 ± 0,2 .217 ± .008 |
| | C flat lever  | 50 1.76 | UX40E10C01 | UX40E30C01 | 5,0 .176 | 2,1 .083 | 0,55 .022 | 0,50 .020 | 6,8 ± 1,0 .268 ± .039 |
| | E roller lever simulated  | 55 1.94 | UX40E10E01 | UX40E30E01 | 4,0 .141 | 2,1 .083 | 0,50 .020 | 0,50 .020 | 9,5 ± 1,0 .374 ± .039 |

OTHER TERMINATION TYPES ARE AVAILABLE

For PC right angle, change 2nd set of numbers to 50 (Example: UX10C**50**A01)

For PC left angle, change 2nd set of numbers to 60 (Example: UX10C**60**A01)

Basic Switches

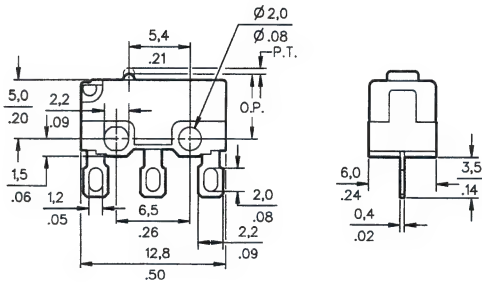
Subminiature

UX Series

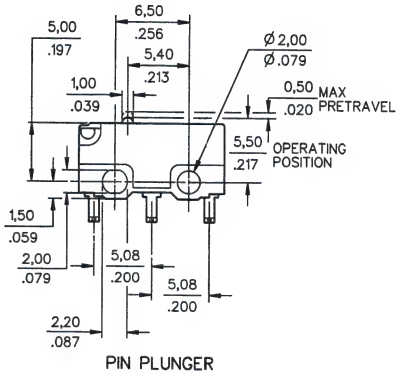
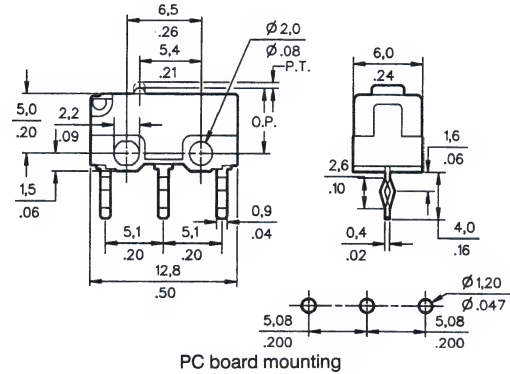
MOUNTING DIMENSIONS (for reference only) $\frac{\text{mm}}{\text{in.}}$

Pin plunger (Type A)

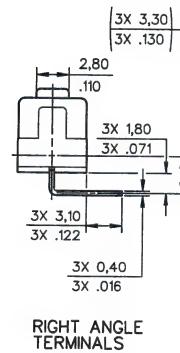
Solder terminals – Type 10



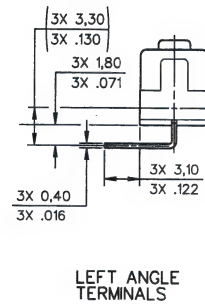
PC board terminals – Type 30



Type 50



Type 60



RIGHT ANGLE
TERMINALS

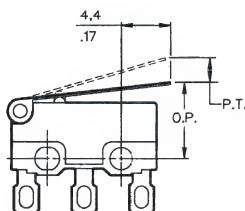
LEFT ANGLE
TERMINALS

LEVER ACTUATORS

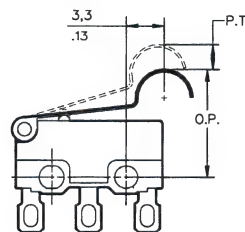
UX Series switches with lever actuators can be operated by cams or slides. They require lower operating forces than pin plunger switches.

Flat levers are .520 in. (13.2 mm) long and simulated roller levers are .480 in. (12.2 mm) long.

Flat lever (Type C)



Simulated Roller Lever (Type E)



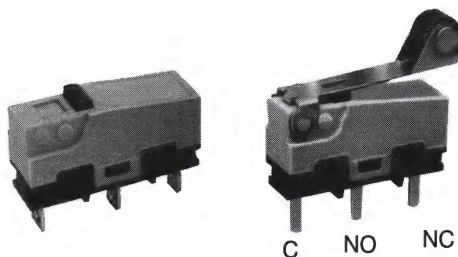
Mounting screw size is 2 mm.
Maximum tightening torque is 1 kg-cm.

Miniature/
Subminiature

Basic Switches

Subminiature

UM Series



FEATURES

- Choice of low energy or power duty electrical ratings
- Variety of integral actuators
- Temperature Range: -25° to $+85^{\circ}\text{C}$ (-13° to 185°F)
- Weight: 2 grams (.07 oz.)
- UL/CSA/VDE/SEMKO marking designations
- Form C single-pole double-throw (SPDT) circuitry

ELECTRICAL RATINGS (in amps)




| Voltage | UM50E Silver Contacts | | UM40B/D Silver Contacts | | UM10A/B/D/E Gold Contacts |
|---------|--------------------------|-----------|----------------------------|-----------|------------------------------|
| | Resistive | Inductive | Resistive | Inductive | Resistive |
| 125 VAC | 5 | 3 | 3 | 2 | 0.1 |
| 250 VAC | 5 | 3 | 3 | 2 | 0.1 |
| 30 VDC | 5 | 3* | 3 | 2* | 0.1 |

*Time constant for DC inductive loads: less than 7 msec.
UL File No. E12252, CSA File LR23413M167

ORDER GUIDE 0.1 AMP TYPE GOLD CONTACTS

| Rating | Actuator Length | O.F. max. grams oz. | Terminals | | R.F. min. g ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|------------------------|----------------------|---------------------------|------------|------------|--------------------------|---------------------------|---------------------------|---------------------------|----------------------------------|
| | | | Solder | .110 QC | | | | | |
| 0.1 Amp 250 VAC | A pin plunger | 25 .88 | UM10A10A01 | UM10A70A01 | 2 .071 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 \pm 0,3 .331 \pm .012 |
| | | 50 1.76 | UM10B10A01 | UM10B70A01 | 7,5 .265 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 \pm 0,3 .331 \pm .012 |
| | | 100 3.57 | UM10D10A01 | UM10D70A01 | 15 .529 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 \pm 0,3 .331 \pm .012 |
| | | 150 5.3 | UM10E10A01 | UM10E70A01 | 20 .705 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 \pm 0,3 .331 \pm .012 |
| | B flat lever 18mm | 10 .35 | UM10A10B01 | UM10A70B01 | 0,4 .014 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 \pm 0,8 .346 \pm .031 |
| | | 20 .7 | UM10B10B01 | UM10B70B01 | 1,7 .060 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 \pm 0,8 .346 \pm .031 |
| | | 40 1.4 | UM10D10B01 | UM10D70B01 | 3,5 .123 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 \pm 0,8 .346 \pm .031 |
| | | 60 2.1 | UM10E10B01 | UM10E70B01 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 \pm 0,8 .346 \pm .031 |
| | C flat lever 20mm | 8 .28 | UM10A10C01 | UM10A70C01 | 0,35 .012 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 \pm 0,8 .346 \pm .031 |
| | | 16 .56 | UM10B10C01 | UM10B70C01 | 1,5 .053 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 \pm 0,8 .346 \pm .031 |
| | | 35 1.23 | UM10D10C01 | UM10D70C01 | 3,0 .106 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 \pm 0,8 .346 \pm .031 |
| | | 55 2 | UM10E10C01 | UM10E70C01 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 \pm 0,8 .346 \pm .031 |
| | D flat lever 26mm | 12 .4 | UM10B10D01 | UM10B70D01 | 1,2 .042 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 \pm 1,2 .346 \pm .047 |
| | | 25 .88 | UM10D10D01 | UM10D70D01 | 2,5 .088 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 \pm 1,2 .346 \pm .047 |
| | | 45 1.6 | UM10E10D01 | UM10E70D01 | 3,0 .106 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 \pm 1,2 .346 \pm .047 |
| | | | | | | | | | |

ORDER GUIDE 0.1 AMP TYPE GOLD CONTACTS cont.

| Rating | Actuator Length | O.F. max. grams oz. | Terminals | | R.F. min. g ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|---|---|---------------------------|------------|------------|--------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| | | | Solder | .110 QC | | | | | |
| 0.1 Amp 250 VAC  | J flat lever 60mm | 6 .2 | UM10B10J01 | UM10B70J01 | 0,5 .018 | 8,5 .335 | 2,2 .087 | 2,5 .098 | 8,8 ± 2,4 .346 ± .094 |
| | | 15 .52 | UM10D10J01 | UM10D70J01 | 1,0 .035 | 8,5 .335 | 2,2 .087 | 2,5 .098 | 8,8 ± 2,4 .346 ± .094 |
| | | 20 .7 | UM10E10J01 | UM10E70J01 | 1,0 .035 | 8,5 .335 | 2,2 .087 | 2,5 .098 | 8,8 ± 2,4 .346 ± .094 |
| 0.1 Amp 250 VAC  | E simulated roller lever, radius 2,5mm, 19mm | 16 .56 | UM10B10E01 | UM10B70E01 | 1,5 .053 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| | | 35 1.23 | UM10D10E01 | UM10D70E01 | 3,0 .106 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| | | 55 2 | UM10E10E01 | UM10E70E01 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| | H simulated roller lever, radius 1,3mm, 19mm | 16 .56 | UM10B10H01 | UM10B70H01 | 1,5 .053 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 10,7 ± 0,8 .421 ± .031 |
| | | 35 1.23 | UM10D10H01 | UM10D70H01 | 3,0 .106 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 10,7 ± 0,8 .421 ± .031 |
| | | 55 2 | UM10E10H01 | UM10E70H01 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 10,7 ± 0,8 .421 ± .031 |
| 0.1 Amp 250 VAC  | F roller lever 18,00mm | 20 .7 | UM10B10F01 | UM10B70F01 | 1,7 .060 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,50 ± 0,8 .571 ± .031 |
| | | 40 1.4 | UM10D10F01 | UM10D70F01 | 3,5 .123 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,50 ± 0,8 .571 ± .031 |
| | | 60 2.1 | UM10E10F01 | UM10E70F01 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,50 ± 0,8 .571 ± .031 |

Miniature/
Subminiature

OTHER TERMINATION TYPES ARE AVAILABLE






For PC Straight cross-line, change 2nd set of numbers to 20 (Example: UM10A20A01)

For PC Straight international, change 2nd set of numbers to 40 (Example: UM10A40A01)

For PC Straight right angle, change 2nd set of numbers to 50 (Example: UM10A50A01)

For PC Straight left angle, change 2nd set of numbers to 60 (Example: UM10A60A01)

ORDER GUIDE 3 AND 5 AMP TYPE SILVER CONTACTS

| Rating | Actuator Length | O.F. max. grams oz. | Terminals | | R.F. min. g ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|---|---|---------------------------|------------|------------|--------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| | | | Solder | .110 QC | | | | | |
| 3 Amp 250 VAC  | A pin plunger | 50 1.76 | UM40B10A01 | UM40B70A01 | 7,5 .265 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 ± 0,3 .331 ± .012 |
| | | 100 3.527 | UM40D10A01 | UM40D70A01 | 15,0 .529 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 ± 0,3 .331 ± .012 |
| 3 Amp 250 VAC  | B flat lever 18mm | 20 .7 | UM40B10B01 | UM40B70B01 | 1,7 .060 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 ± 0,8 .346 ± .031 |
| | | 40 1.4 | UM40D10B01 | UM40D70B01 | 3,5 .123 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 ± 0,8 .346 ± .031 |
| | C flat lever 20mm | 16 .56 | UM40B10C01 | UM40B70C01 | 1,5 .053 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 ± 0,8 .346 ± .031 |
| | | 35 1.23 | UM40D10C01 | UM40D70C01 | 3,0 .106 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 ± 0,8 .346 ± .031 |
| | D flat lever 26mm | 12 .4 | UM40B10D01 | UM40B70D01 | 1,2 .042 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 ± 1,2 .346 ± .047 |
| | | 25 .88 | UM40D10D01 | UM40D70D01 | 2,5 .088 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 ± 1,2 .346 ± .047 |
| | J flat lever 60mm | 6 .2 | UM40B10J01 | UM40B70J01 | 0,5 .018 | 8,5 .335 | 2,2 .087 | 2,5 .098 | 8,8 ± 2,4 .346 ± .094 |
| | | 15 .52 | UM40D10J01 | UM40D70J01 | 1,0 .035 | 8,5 .335 | 2,2 .087 | 2,5 .098 | 8,8 ± 2,4 .346 ± .094 |
| 3 Amp 250 VAC  | E simulated roller lever, radius 2,5mm 19mm | 16 .56 | UM40B10E01 | UM40B70E01 | 1,5 .053 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| | | 35 1.23 | UM40D10E01 | UM40D70E01 | 3,0 .106 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| | H simulated roller lever, radius 1,3mm 19,15mm | 16 .56 | UM40B10H01 | UM40B70H01 | 1,5 .053 | 2,8 .110 | 1,2 .047 | 0,8 .021 | 10,7 ± 0,8 .421 ± .031 |
| | | 35 1.23 | UM40D10H01 | UM40D70H01 | 3,0 .106 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 10,7 ± 0,8 .421 ± .031 |
|  | F roller lever 18mm | 20 .7 | UM40B10F01 | UM40B70F01 | 1,7 .060 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,50 ± 0,8 .571 ± .031 |
| | | 40 1.4 | UM40D10F01 | UM40D70F01 | 3,5 .123 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,50 ± 0,8 .571 ± .031 |
| 5 Amp 250 VAC  | A pin plunger | 150 5.3 | UM50E10A01 | UM50E70A01 | 20 .705 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 ± 0,3 .331 ± .012 |
| | B flat lever 18mm | 60 2.1 | UM50E10B01 | UM50E70B01 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 ± 0,8 .346 ± .031 |
| | | 55 2 | UM50E10C01 | UM50E70C01 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 ± 0,8 .346 ± .031 |
| | D flat lever 26mm | 45 1.6 | UM50E10D01 | UM50E70D01 | 3,0 .106 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 ± 1,2 .346 ± .047 |
| | J flat lever 60mm | | UM50E10J01 | UM50E70J01 | 1,0 .035 | 8,5 .335 | 2,2 .087 | 2,5 .098 | 8,8 ± 2,4 .346 ± .094 |
| | E simulated roller lever, radius 2,5mm 19mm | 55 2 | UM50E10E01 | UM50E70E01 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| | | 55 2 | UM50E10H01 | UM50E70H01 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 10,7 ± 0,8 .421 ± .031 |
| | F roller lever 18mm | 60 2.1 | UM50E10F01 | UM50E70F01 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,50 ± 0,8 .571 ± .031 |

OTHER TERMINATION TYPES ARE AVAILABLE

For PC Straight cross-line, change 2nd set of numbers to 20 (Example: UM40B20A01)
 For PC Straight international, change 2nd set of numbers to 40 (Example: UM40B40A01)
 For PC Straight right angle, change 2nd set of numbers to 50 (Example: UM40B50A01)
 For PC Straight left angle, change 2nd set of numbers to 60 (Example: UM40B60A01)

Basic Switches

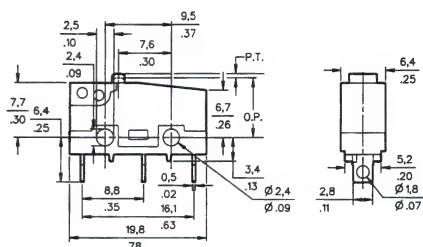
Subminiature

UM Series

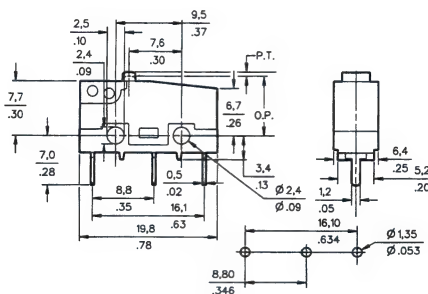
MOUNTING DIMENSIONS (for reference only) $\frac{\text{mm}}{\text{in.}}$

Pin Plunger Type A

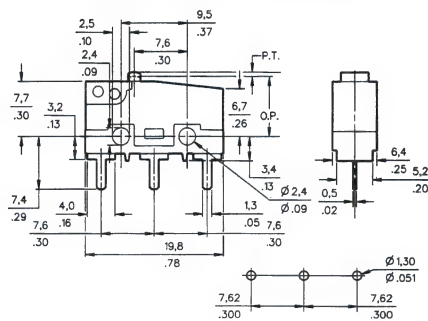
Solder Cross-line Terminals – Type 10



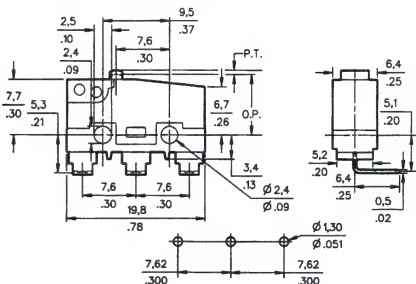
PC Straight Cross-Line – Type 20



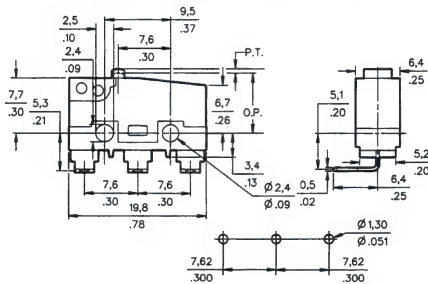
PC Straight In-line – Type 40



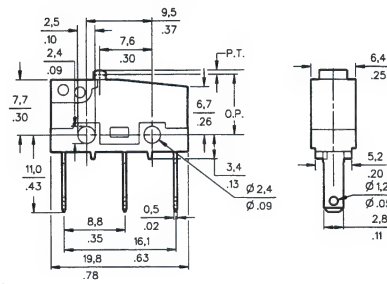
PC Right Angle In-line – Type 50



PC Left Angle In-line – Type 60

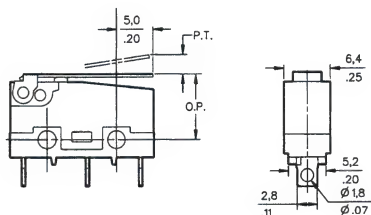


QC Quick Connect – Type 70

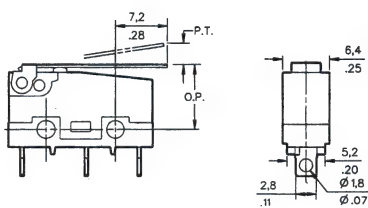


Lever Actuators 4mm (.158) wide

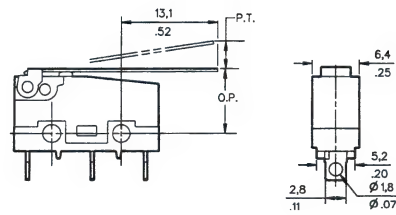
18mm Flat Lever Type B



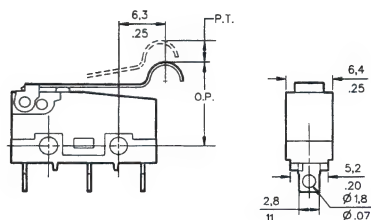
20mm Flat Lever Type C



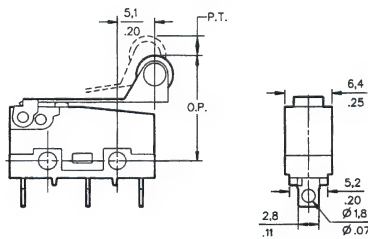
26mm Flat Lever Type D 60mm Type J



19mm Simulated Roller Type E/H Type H has 1,3mm radius Type E has 2,5mm radius



18mm Roller Lever Type F 5mm (.197 in.) dia. x 3,2mm (.126 in.) thick roller



Mounting screw size is m 2,3.
Maximum tightening torque is 3 kg-cm.

Miniature/
Subminiature

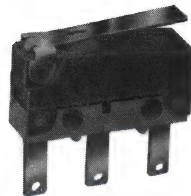
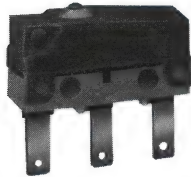
Basic Switches

Sealed Subminiature

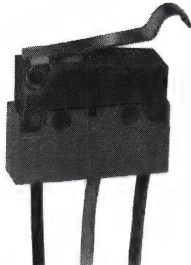
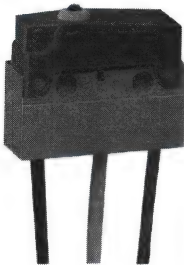
UM Series



IP50-SEALED



IP67-SEALED



FEATURES

- Silver or gold contacts
- Variety of integral actuator styles including pin plunger, flat lever, roller lever, and simulated roller lever
- IP50 or IP67 type sealing
- Choice of quick-connect, printed circuit board, solder or leadwire termination
- Form C single-pole double-throw
- Temperature range: -40° to 85°C (-40° to 185°F)
- Weight, approx.: .07 oz. (2g.) for IP50-sealed switches; and .14 oz. (4g.) for IP67-sealed switches, not including leadwires
- UL, CSA, VDE, and SEMKO marking designations

ELECTRICAL RATINGS (in amps)

| Voltage | Silver Contacts | | Gold Contacts Resistive |
|---------|-----------------|-----------|----------------------------|
| | Resistive | Inductive | |
| 125 VAC | 2.0 | 2.0 | 0.1A |
| 250 VAC | 2.0 | 2.0 | 0.1A |
| 30 VDC | 2.0 | 2.0 | 0.1A |
| 125 VDC | 0.4 | 0.05 | — |

UL File No. E12252, CSA File LR23413M167

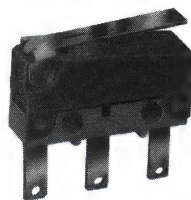
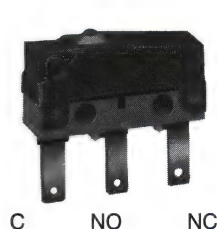
IP50-sealed UM switches are the same size as non-sealed UM switches on pages 12-15. There is an elastomer seal on the switch plunger and a cover-to-case seal. They provide a degree of protection against the entry of dust.

IP67-sealed UM switches have the plunger seal and cover-to-case seal. In addition, their AWG #20 leadwires are molded in epoxy resin. They provide a degree of protection against water entry during temporary immersion.

Basic Switches

IP50-Sealed Subminiature

UM Series



ORDER GUIDE IP50 SEALED 0.1-AMP GOLD CONTACTS

| Actuators | O.F. max. grams oz. | Termination | | R.F. min. grams ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|-----------------------------|---------------------------|-------------|------------|------------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| | | Solder | .110 QC | | | | | |
| A pin plunger | 150 5.3 | UM10E11AS1 | UM10E71AS1 | 20 .705 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 ± 0,3 .331 ± .012 |
| B flat lever | 60 2.1 | UM10E11BS1 | UM10E71BS1 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 ± 0,8 .346 ± .031 |
| C flat lever | 55 1.9 | UM10E11CS1 | UM10E71CS1 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 ± 0,8 .346 ± .031 |
| D flat lever | 45 1.6 | UM10E11DS1 | UM10E71DS1 | 3,0 .106 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 ± 1,2 .346 ± .047 |
| E simulated roller lever | 55 1.9 | UM10E11ES1 | UM10E71ES1 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| F roller lever | 60 2.1 | UM10E11FS1 | UM10E71FS1 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,5 ± 0,8 .571 ± .031 |

Miniature/
Subminiature

ORDER GUIDE IP50 SEALED 2.0-AMP SILVER CONTACTS

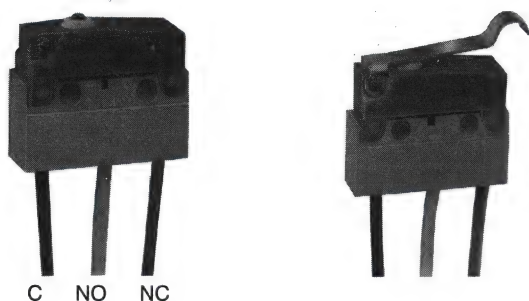
| Actuators | O.F. max. grams oz. | Termination | | R.F. min. grams ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|-----------------------------|---------------------------|-------------|------------|------------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| | | Solder | .110 QC | | | | | |
| A pin plunger | 150 5.3 | UM35E11AS1 | UM35E71AS1 | 20 .705 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 ± 0,3 .331 ± .012 |
| B flat lever | 60 2.1 | UM35E11BS1 | UM35E71BS1 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 ± 0,8 .346 ± .031 |
| C flat lever | 55 1.9 | UM35E11CS1 | UM35E71CS1 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 ± 0,8 .346 ± .031 |
| D flat lever | 45 1.6 | UM35E11DS1 | UM35E71DS1 | 3,0 .106 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 ± 1,2 .346 ± .047 |
| E simulated roller lever | 55 1.9 | UM35E11ES1 | UM35E71ES1 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| F roller lever | 60 2.1 | UM35E11FS1 | UM35E71FS1 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,5 ± 0,8 .571 ± .031 |

TO SPECIFY PC TERMINALS:

In the order guides above, change the 2nd set of numbers to 21. **Example:** UM10E11AS1 converts to UM10E21AS1 with PC terminals

IP67-Sealed Subminiature

UM Series



ORDER GUIDE IP67 SEALED 0.1-AMP GOLD AND 2.0-AMP SILVER CONTACTS

| Actuators | O.F. max. grams oz. | Leadwire Termination | | R.F. min. grams ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P mm inches |
|--------------------------|---------------------------|----------------------|-----------------|------------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| | | Gold Contacts | Silver Contacts | | | | | |
| A pin plunger | 150 5.3 | UM10E90AS1 | UM35E90AS1 | 20 .705 | 0,6 .024 | 0,4 .016 | 0,1 .004 | 8,4 ± 0,3 .331 ± .012 |
| B flat lever | 60 2.1 | UM10E90BS1 | UM35E90BS1 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 8,8 ± 0,8 .346 ± .031 |
| C flat lever | 55 1.9 | UM10E90CS1 | UM35E90CS1 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 8,8 ± 0,8 .346 ± .031 |
| D flat lever | 45 1.6 | UM10E90DS1 | UM35E90DS1 | 3,0 .106 | 3,5 .138 | 1,6 .063 | 1,0 .039 | 8,8 ± 1,2 .346 ± .047 |
| E simulated roller lever | 55 1.9 | UM10E90ES1 | UM35E90ES1 | 3,5 .123 | 2,8 .110 | 1,2 .047 | 0,8 .031 | 11,65 ± 0,8 .459 ± .031 |
| F roller lever | 60 2.1 | UM10E90FS1 | UM35E90FS1 | 4,0 .141 | 2,5 .098 | 0,8 .031 | 0,5 .020 | 14,5 ± 0,8 .571 ± .031 |

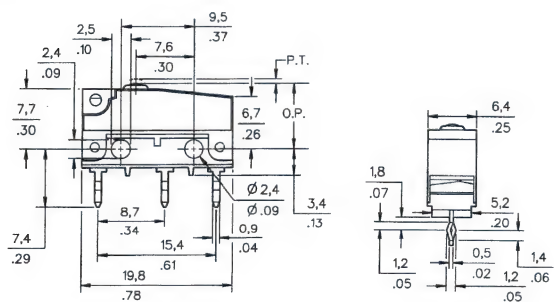
MOUNTING DIMENSIONS (For reference only)

mm
in.

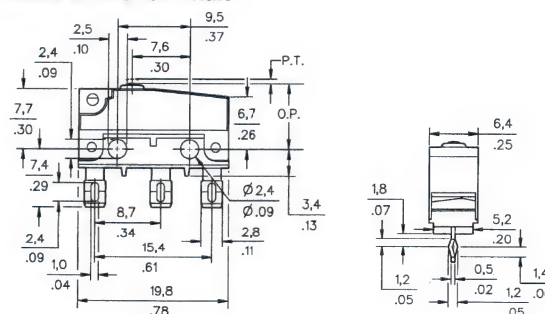
Mounting screw size is m 2,3
Maximum torque is 3 kg/cm.

Pin Plunger Type A

PC Terminals



Solder In-line Terminals



Basic Switches

IP50-Sealed Subminiature

UM Series

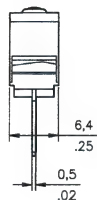
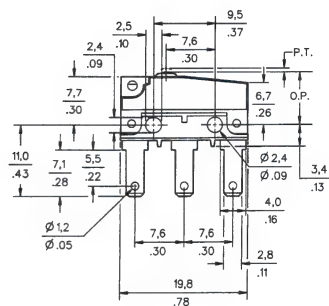
MOUNTING DIMENSIONS (For reference only)

mm
in.

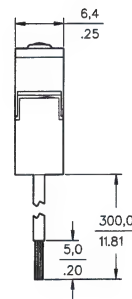
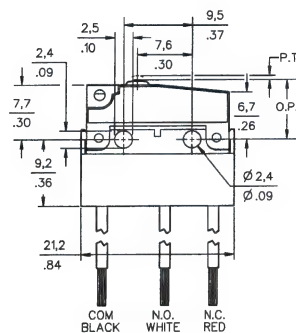
Mounting screw size is m 2,3
Maximum torque is 3 kg/cm.

Pin Plunger Type A

QC In-line Terminals

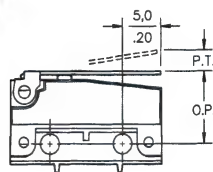


Leadwires

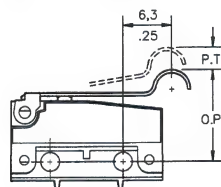


Lever Actuators 4 mm/.158 in. wide

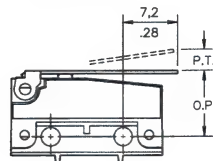
18 mm Flat Lever Type B



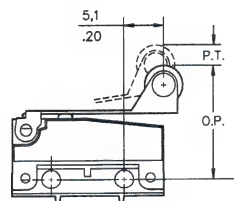
19 mm Simulated Roller Lever Type E 2,5 mm radius



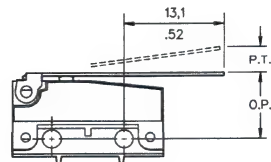
20 mm Flat Lever Type C



18 mm Roller Lever Type F 5 mm/.197 in. dia. x 3,2 mm/.126 in. Thick Roller



26 mm Flat Lever Type D



Miniature/
Subminiature














Basic Switches












Subminiature/Miniature

ELECTRICAL DATA AND UL CODES

MINIATURE/SUBMINIATURE BASIC SWITCHES

Most of the switches in this section are UL recognized and CSA certified. The current and voltage values shown are based on test conditions specified by these agencies. Electrical life of the switch is influenced by each application condition as well as by voltage and current.

| Circuitry | Electrical Data |
|--|---|
| Single-pole double-throw  | A 5 amps res., 3 amps ind., (sea level), 4 amps res., 2 amps ind., (50,000 feet), 28 vdc 5 amps res. or ind. 115 vac, 60 Hz. UL/CSA rating: 5 amps, 250 vac. |
| Single-pole double-throw  | B 7 amps res., 4 amps ind., (sea level), 7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. UL/CSA rating: 7 amps, 250 vac. |
| Single-pole double-throw  | C 3.5 amps res., 2 amps ind., (sea level), 3.5 amps res., 1.5 amps ind., (50,000 feet), 28 vdc. UL rating: 7 amps, 250 vac. |
| Single-pole double-throw  | D 1 amp res., 0.5 amp ind., (sea level and 50,000 feet), 28 vdc. UL/CSA rating: 1 amp, 125 vac. |
| Single-pole double-throw  | E 3 amps res., 2 amps ind., (sea level), 28 vdc. UL rating: 3 amps, 250 vac. |
| Single-pole double-throw  | F 7 amps res., 4 amps ind., 2.5 amps lamp load, (sea level), 4 amps res., 2.5 amps ind., 2.5 amps lamp load, (50,000 feet), 28 vdc. 7 amps res., 7 amps ind., 2 amps lamp load, 115 vac, 60 Hz (sea level). |
| Single-pole double-throw  | G 2 amps res., lamp ind., (sea level) 28 vdc. |
| Single-pole double-throw  | H .010 amp res. and ind., (sea level). 28 vdc. UL/CSA rating: 1 amp, 125 vac. |
| Single-pole double-throw  | I 7 amps res., 4 amps ind., (sea level), 28 vdc. |
| Single-pole double-throw  | J 5 amps res., 3 amps ind., (sea level), 5 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. UL rating: 5 amps, 250 vac. |
| Single-pole double-throw  | K UL rating: 5 amps, 125 or 250 vac. |
| Single-pole double-throw  | L 1 amp res., 1/2 amp ind., (sea level) 28 vdc. |
| Single-pole double-throw  | M UL rating: 11 amps and 1/4 hp, 125 or 250 vac. |
| Single-pole double-throw | N 1 amp res., 0.5 amp ind., 30 vdc. UL rating: 1 amp, 125 vac. |
| Single-pole double-throw | P 1 amp res., 30 vdc. UL rating: .1 amp, 125 vac. |
| Single-pole double-throw | R 5 amps res., 3 amps ind., 2.4 amps lamp load (sea level), 5 amps res., 2.5 amps ind., 2.4 amps lamp load, (50,000 feet), 28 vdc. 5 amps res., 5 amps ind., 1.5 amps lamp load, 115 vac. 60 Hz (sea level) |

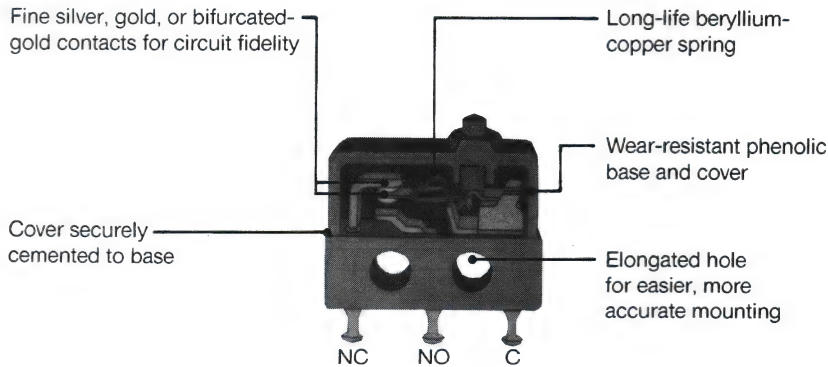
| Circuitry | Electrical Data |
|---|---|
| Single-pole double-throw  | S UL rating: 4 amps, 250 vac. |
| Single-pole double-throw  | T UL/CSA rating: 11 amps and 1/3 hp, 125, 250, or 277 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 4 amps, 125 vac "L" (lamp load). TT UL/CSA rating: 10 amps and 1/3 hp, 125 or 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 4 amps, 125 vac "L" (lamp load). |
| Single-pole double-throw unless otherwise noted in order guide  | UU 10 amps res., 10 amps ind., (sea level), 6 amps ind. (50,000 feet), 6 amps motor load, 30 vdc. U UL/CSA rating: 15.1 amps and 1/2 hp, 125 or 250 vac. 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 5 amps, 120 vac "L" (lamp load). |
| Single-pole double-throw  | VV UL/CSA rating: 3 amps-125, 250, 277 vac; 1/10 hp-250 vac |
| Single-pole double-throw  | V UL/CSA rating: 10 amps and 1/4 hp, 125 or 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 3 amps, 125 vac "L" (lamp load). |
| Single-pole double-throw  | W 10 amps, 250 vac or 28 vdc; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. |
| Single-pole double-throw  | X UL rating: 1 amp, 125 vac. |
| Single-pole double-throw  | Y 10 amps and 1/3 hp, 125 or 250 vac; 4 amps, 125 vac "L" (lamp load). |
| Single-pole double-throw  | YY UL/CSA rating: 5 amps-125, 250, 277 vac 1/10 hp-250 vac |
| Two-circuit double-break  Four-circuit double-break  | Z 10 amps, 125 or 250 vac, or 30 vdc. UL/CSA rating: 10 amps, 125 or 250 vac; 1/2 hp, 125 vac. |
| Single-pole double-throw | ZZ UL rating: 5 amps and 1/10 hp. 125 or 250 vac. |
| Single-pole double-throw | AA UL rating: 20 amps, 277 vac. 1 hp, 125 vac; 2 hp, 250 vac. |
| Single-pole double-throw | BB UL rating: 25 amps, 277 vac. 1 hp, 125 vac; 2 hp, 250 vac. |

Basic Switches

Subminiature

SX Series

CUT-A-WAY 1SX SUBMINIATURE BASIC SWITCH



AVAILABLE TERMINALS

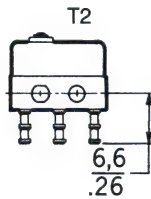
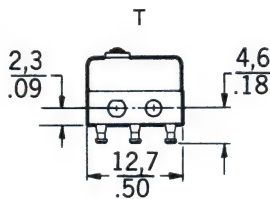
SX switches are available with several types of terminations. The T and T2 terminals provide easy solder lead wire attachment. The H58 terminal offers the simplicity of quick-connect and mate with AMP .058-inch receptacles. Pin terminals allow easy attachment to printed circuit boards.

GENERAL INFORMATION

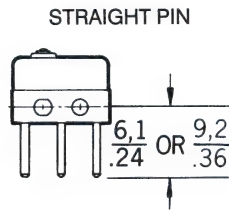
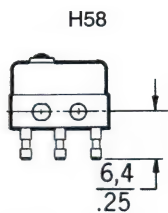
SX subminiature basic switches are small size precision snap-action switches from MICRO SWITCH. These switches are ideal where savings in space and weight are important. Unless otherwise noted, all listings have silver contacts.

FEATURES

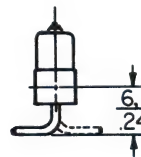
- Low operating force to 3 oz. (85 grams) maximum
- Sensitive differential travel as low as .001 inch maximum
- Power load switching capability up to 7 amperes—silver contacts
- Optional gold contacts for low energy applications
- Optional bifurcated gold contacts for maximum reliability
- Long mechanical life up to 10,000,000 cycles—95% survival for 11SX series 1,000,000 cycles—95% survival for 1SX series
- Temperature tolerance -65° to $+250^{\circ}\text{F}$ (-54 to 121°C) on standard construction
- High temperature designs for up to $+400^{\circ}\text{F}$ (204°C) for 100 hours
- Variety of integral and auxiliary actuators
- Choice of several terminal styles
- MIL-S-8805 qualified products available
- UL recognized File #E12252, CSA certified file # LR41372



Mounting torque Round head 2-56 UNC 438 screws—2 inch pounds max.



H391, H392
90° FORMED PIN



Mate with Amp Inc. Part No. 640024-1 Std.

Dimensions shown are for reference only

Key: $\frac{0,0}{0.00} = \text{mm}$
 $\frac{0.00}{0.00} = \text{inches}$

This section covers only **40** of our most popular SX Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **200** other active SX listings will meet your needs. Contact the 800 number.

Miniature/
Subminiature

Basic Switches

Subminiature

SX Series

PIN PLUNGER

ORDER GUIDE by ascending electrical capability

| Catalog Listing | Recommended for | Electrical Data and UL Code Page 20 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|------------------------|---|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|-----------------|
| 11SX91-T | Logic level loads 5VDC, 2mA; SPNO | At Left | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,1 .004 | 8,13 .320 |
| 12SX2-T | Best reliability (Bifurcated gold contacts) | .010 Amp H | 0,7 to 1,39 2.5 to 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,051 .002 | 8,13 .320 |
| 3SX1-T | Applications requiring gold contacts (1SX type) | 1 Amp D | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 12SX1-T | Best reliability with higher current rating (Bifurcated gold contacts) | 1 Amp D | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,076 .003 | 8,13 .320 |
| 12SX3-T | Lowest differential travel with bifurcated gold contacts | 1 Amp H | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,025 .001 | 8,13 .320 |
| 13SX21-T | Applications requiring gold contacts. 11SX type. | 1 Amp D | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,051 .002 | 8,13 .320 |
| 23SX39-T (MS24547-2) | MIL-S-8805 applications requiring gold contacts +180°F (82°C) max. use | 1 Amp D | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 23SX39-T2 (MS24547-5) | As above, with T2 terminals | 1 Amp D | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 93SX39-T M8805/109-03 | .156" wide, with gold contacts +180°F (82°C) | 1 Amp D | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 411SX21-T M8805/106-01 | +400°F (204°C) for 100 hours | G | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .220 |
| 413SX21-T M8805/106-02 | +400°F (204°C) for 100 hours | L | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,051 .002 | 8,13 .220 |
| 11SX1-T | Lowest differential travel | 3 Amps E | 0,97 3.5 | 0,21 0.75 | 0,51 .020 | 0,1 .004 | 0,025 .001 | 8,13 .320 |
| 11SX21-T | Most applications | 5 Amps A | 0,7 to 1,39 2.5 to 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,051 .002 | 8,13 .320 |
| 11SX22-T | For use in sealed enclosures. | 5 Amps A | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,076 .003 | 8,13 .320 |
| 17SX21-T | Best stability under varying humidity. 11SX type. | 5 Amps A | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,051 .002 | 8,13 .320 |
| 1SX1-T | Up to 7 amps load handling | 7 Amps B | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 1SX12-T | Low differential travel | 7 Amps C | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,051 .002 | 8,13 .320 |
| 1SX48-T | Added overtravel | 7 Amps B | 1,39 5 | 0,28 1 | 0,51 .020 | 0,25 .010 | 0,13 .005 | 8,13 .320 |
| 2SX1-T | Lower force | 7 Amps B | 0,83 3 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 4SX1-T | Operating in temperature to +400°F (204°C) for 100 hours | 7 Amps I | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 21SX1-T | Best stability under varying humidity (1SX type) | 7 Amps B | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 21SX39-T (MS24547-1) | MIL-S-8805 application requirements +180°F (82°C) | 7 Amps F | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 21SX39-T2 (MS24547-4) | MIL-S-8805 application requirements +180°F (82°C) | 7 Amps F | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |
| 91SX39-T M8805/109-01 | .156" wide version of standard SX +180°F (82°C) | 7 Amps F | 1,39 5 | 0,28 1 | 0,51 .020 | 0,1 .004 | 0,13 .005 | 8,13 .320 |

*±0,38 mm
±.015 in.



Dim. Dwg. Fig. 1
(Except Fig. 2
for 91SX39-T
and 93SX34-T)

Basic Switches

Subminiature

SX Series

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position

ORDER GUIDE

INTEGRAL LEVERS



Dim. Dwg. Fig. 3

| Catalog Listing | Description | Electrical Data And UL Code Page 20 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|-----------------|------------------------------------|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|-------------------------------|
| 311SX1-T | .135 inch (3,43 mm) straight lever | 5 Amps A | 0,49 1.76 | 0,09 .32 | 1,65 .065 | 0,36 .014 | 0,51 .020 | 8,43±1,14 .332±.045 |
| 313SX1-T | As above with gold contacts | 1 Amp D | 0,49 1.76 | 0,09 .32 | 1,65 .065 | 0,36 .014 | 0,51 .020 | 8,43±1,14 .332±.045 |



Dim. Dwg. Fig. 3

| | | | | | | | | |
|----------|------------------------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|-------------------------------|
| 311SX2-T | .505 inch (12,8 mm) straight lever | 5 Amps A | 0,31 1.1 | 0,05 .18 | 2,92 .115 | 0,64 .025 | 0,89 .035 | 8,26±1,91 .325±.075 |
| 313SX2-T | As above with gold contacts | 1 Amp D | 0,31 1.1 | 0,05 .18 | 2,92 .115 | 0,64 .025 | 0,89 .035 | 8,26±1,91 .325±.075 |



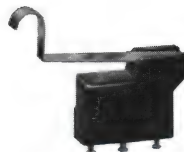
Dim. Dwg. Fig. 4

| | | | | | | | | |
|----------|------------------------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|-------------------------------|
| 311SX3-T | .965 inch (24,5 mm) straight lever | 5 Amps A | 0,20 .71 | 0,03 .11 | 4,70 .185 | 0,61 .024 | 1,52 .060 | 7,75±2,92 .305±.115 |
| 313SX3-T | As above with gold contacts | 1 Amp D | 0,20 .71 | 0,03 .11 | 4,70 .185 | 0,61 .024 | 1,52 .060 | 7,75±2,92 .305±.115 |



Dim. Dwg. Fig. 5

| | | | | | | | | |
|----------|---|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------------------|
| 311SX4-T | .042 inch (1,1 mm) simulated roller lever | 5 Amps A | 0,58 2.1 | 0,11 .39 | 1,27 .050 | 0,25 .010 | 0,38 .015 | 14,15±0,91 .557±.036 |
| 313SX4-T | As above with gold contacts | 1 Amp D | 0,58 2.1 | 0,11 .39 | 1,27 .050 | 0,25 .010 | 0,38 .015 | 14,15±0,91 .557±.036 |



Dim. Dwg. Fig. 6

| | | | | | | | | |
|----------|--|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------------------|
| 311SX5-T | .459 inch (11,7 mm) simulated roller lever | 5 Amps A | 0,31 1.1 | 0,05 .18 | 2,67 .105 | 0,56 .022 | 0,89 .035 | 14,86±1,65 .585±.065 |
| 313SX5-T | As above, with gold contacts | 1 Amp D | 0,31 1.1 | 0,05 .18 | 2,67 .105 | 0,56 .022 | 0,89 .035 | 14,86±1,65 .585±.065 |

Miniature/
Subminiature

Basic Switches

Subminiature

SX

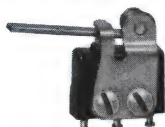
Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position; F.P. – Free Position.

*All characteristics are taken with actuator assembled on Catalog Listing 1SX1-T as shown.

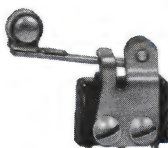
ORDER GUIDE

AUXILIARY ACTUATORS

Switches are not included with actuators.



Dim. Dwg. Fig. 7



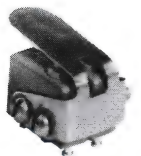
Dim. Dwg. Fig. 8



Dim. Dwg. Fig. 9



Dim. Dwg. Fig. 9



Dim. Dwg. Fig. 10

| Catalog Listing | Description | Actuator Length "A" mm inches | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. mm inches | O.T. mm inches | D.T. max. mm inches | O.P.† mm inches | F.P. mm inches |
|-----------------|-----------------------------------|-------------------------------|--------------------------|--------------------------|----------------|-------------------------|-------------------------|-------------------------|-------------------------|
| JX-20 | Straight lever | 18,3 .72 | 0,28 1 approx. | 0,04 .14 | — | 0,76 .030 approx. | 0,76 .030 approx. | 10,8 .425 approx. | 12,3 .485 approx. |
| JX-219 | Straight lever (For higher temp.) | 18,3 .72 | 0,28 1 | 0,04 .14 | — | 0,76 .030 approx. | 0,76 .030 approx. | 10,8 .425 approx. | 12,3 .485 approx. |

| | | | | | | | | | |
|--------|---------------------------------|-------------|-------------|-------------|---|--------------|--------------|----------------------------|----------------------|
| JX-25 | Roller lever | 16,5 .65 | 0,42 1.5 | 0,04 1.4 | — | 0,51 .020 | 0,76 .030 | 14,9 = 1,14 .585 = .045 | 168 .660 max. |
| JX-220 | Roller lever (For higher temp.) | 16,5 .65 | 0,42 1.5 | 0,04 .14 | — | 0,51 .020 | 0,76 .030 | 14,9 = 1,14 .585 = .045 | 16,8 .660 max. |

| | | | | | | | | | |
|---------|----------------------------------|-------------|-----------|-----------|-----------------|--------------|--------------|-------------|----------------------|
| JX-40 | Straight leaf | 9,4 .37† | 1,95 7 | 0,56 2 | .225 approx. | 0,38 .015 | 0,64 .025 | 7,5 .295 | 12,3 .485 ref. |
| JX-95 | Straight leaf (For higher temp.) | 9,4 .37† | 1,95 7 | 0,56 2 | .225 approx. | 0,38 .015 | 0,64 .025 | 7,5 .295 | 12,3 .485 ref. |
| JX-41** | Reverse leaf | 9,4 .37† | 1,67 6 | 0,28 1 | .110 approx. | 0,38 .015 | 0,64 .025 | 7,5 .295 | 9,4 .370 ref. |

| | | | | | | | | | |
|---------|--------------------------------|-------------|-----------|-----------|-----------------|--------------|--------------|--------------|----------------------|
| JX-45 | Roller leaf | 6,1 .24† | 1,95 7 | 0,28 1 | .225 approx. | 0,38 .015 | 0,64 .025 | 12,2 .480 | 16,5 .650 ref. |
| JX-96 | Roller leaf (For higher temp.) | 6,1 .24† | 1,95 7 | 0,28 1 | .225 approx. | 0,38 .015 | 0,64 .025 | 12,2 .480 | 16,5 .650 ref. |
| JX-51** | Reverse roller leaf | 7,6 .30† | 1,67 6 | 0,56 2 | .110 approx. | 0,38 .015 | 0,64 .025 | 12,8 .505 | 14,7 .580 ref. |

| | | | | | | | | | |
|------|-------------|------------|------------|-----------|-----------------|--------------|--------------|-------------|----------------------|
| JX-4 | Tandem leaf | 7,9 .31 | 4,17 15 | 0,83 3 | .065 approx. | 0,20 .008 | 0,76 .030 | 7,6 .300 | 9,40 .370 ref. |
|------|-------------|------------|------------|-----------|-----------------|--------------|--------------|-------------|----------------------|

**Switch is mounted with plunger end reversed from JX-40.
†"A" measurement is from center of mounting hole nearest tip of lever to the point indicated on drawing.

NOTE: Above actuators should be used at temperatures below +300°F (149°C); except listings JX-95, JX-96, JX-219 and JX-220 are for use with the 4SX1-T to 400°F. (204°C).

Except where stated †† ±0,76 mm ±.030 in.

Basic Switches

Subminiature

SX Series

MOUNTING DIMENSIONS (for reference only)

PIN PLUNGER

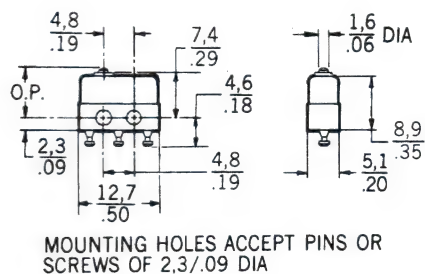


Fig. 1

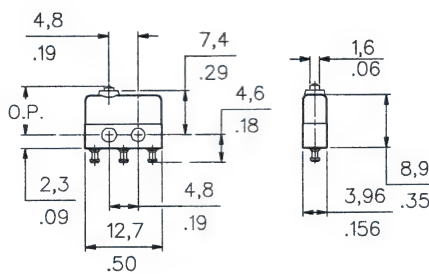


Fig. 2

INTEGRAL LEVERS

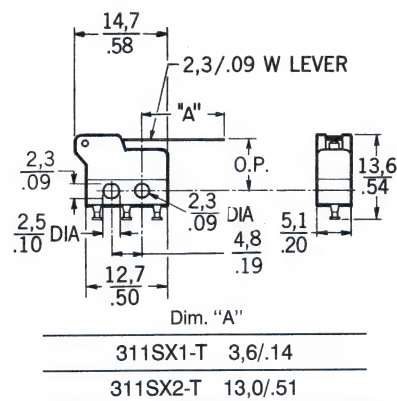


Fig. 3

INTEGRAL LEVERS

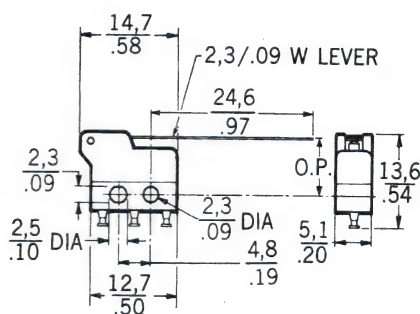


Fig. 4

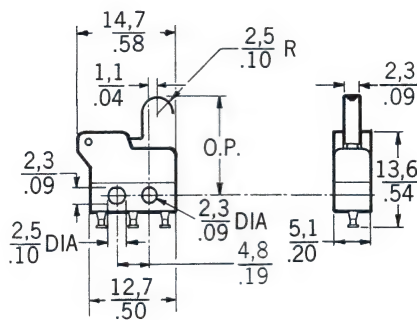
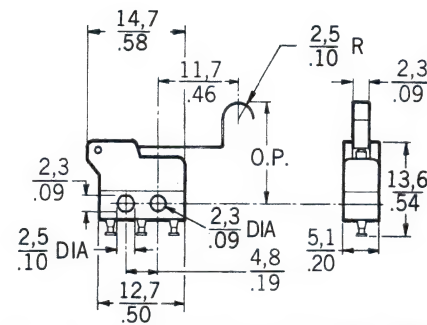


Fig. 5



Interchangeable with 1SX-1T switch with JX-25 actuator.

Fig. 6

AUXILIARY ACTUATORS

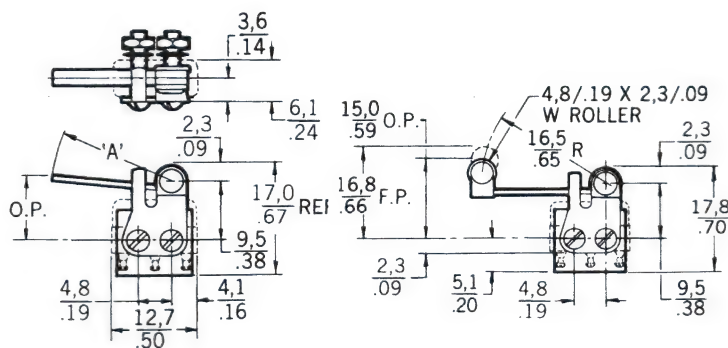


Fig. 7

Switches are not included with actuator.

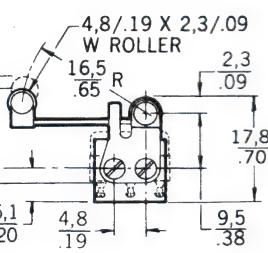


Fig. 8

Mounting holes accept pins or screws of .087 diameter (2,21 mm).

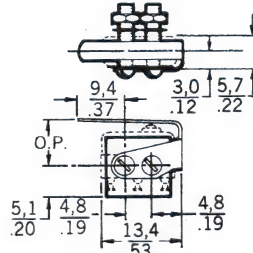


Fig. 9

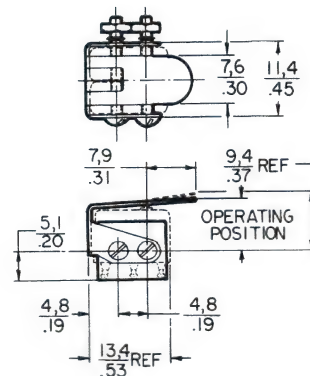


Fig. 10

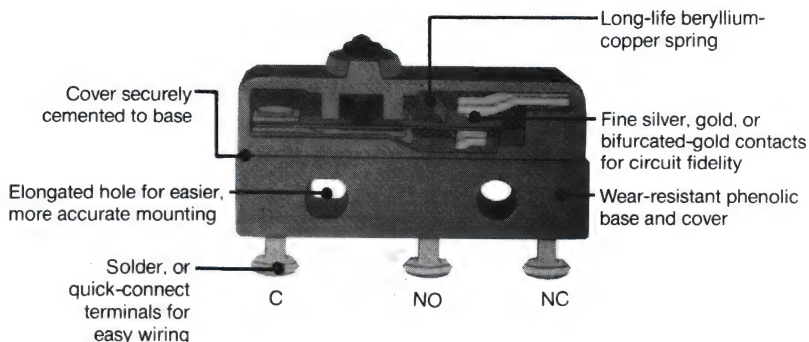
Key: 0,0 = mm
0.00 = inches

Basic Switches

Subminiature

SM Series

CUT-A-WAY SM SUBMINIATURE BASIC SWITCH



AVAILABLE TERMINALS

Various terminals are available for most listings. These include: the T and T2 for wrap-around soldering of leadwires; solder terminals for solder connections; H58 terminals and H4 series terminals provide easy quick-connect installation; H2 type, round wire wrap or PC terminals; H6 rectangular wire wrap terminals are also available. Other quick-connect terminals of the Series H types are available. Contact the 800 number for ordering information.

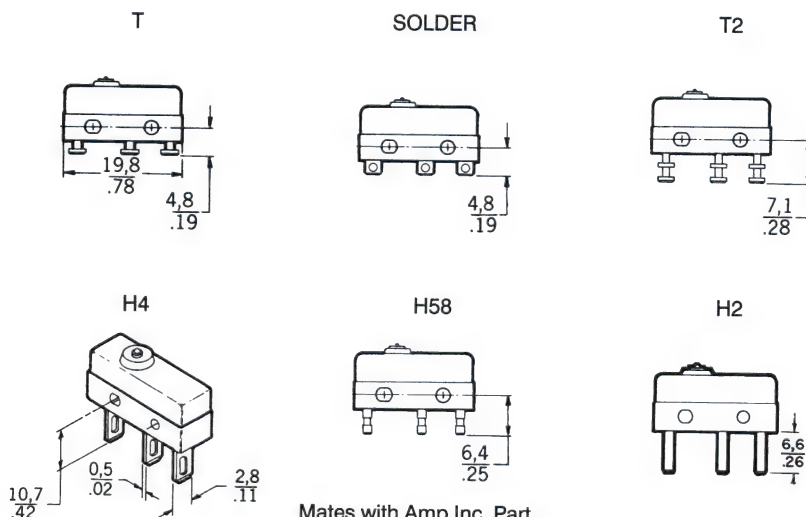
GENERAL INFORMATION

SM subminiature switches are slightly larger than the SX switches. These switches combine small size and light weight with ample electrical capacity, precision operation and long life. Unless otherwise noted, all listings have silver contacts.

FEATURES

- Low operating force to 2 ounces maximum
- Sensitive differential travel as low as .001 inch (0,025 mm) maximum
- Power load switching capability available to 11 amps (VAC) – silver contacts
- Motor load handling capacity to 1/4 hp (VAC)
- Optional gold contacts for low energy applications
- Optional bifurcated gold contacts for maximum reliability
- Long mechanical life
 - 11SM Series 10,000,000 operations
 - 1SM/41SM Series 80,000 operations
 - Bifurcated contacts 1,000,000 operations
- All at 95% survival
- Standard temperature range –65° to +185°F (–54 to 85°C)
- High temperature construction available for use to +400°F (204°C) for 100 hours
- Variety of integral and auxiliary actuators
- Choice of several terminal styles
- Military Standard construction available with three listings on the MIL-S-8805 qualified products list
- UL recognized File #E12252, CSA certified File #LR41372

Mounting Torque:
2.3 inch pounds max.



Dimensions shown are for reference only

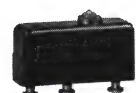
Key: $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

This section covers only **38** of our most popular SM Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **500** other active SM listings will meet your needs. Contact the 800 number.

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

ORDER GUIDE by ascending electrical capability

PIN PLUNGERS



Dim. Dwg. Fig. 1

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 20 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|------------------------|---|-------------------------------------|---------------------|--------------------------|---------------------|---------------------|---------------------|-----------------|
| 11SM1077-T | Gold alloy contacts | .1 Amp P | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 12SM604-T | Bifurcated gold contacts, reduced rating | .1 Amp P | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,076 .003 | 0,1 .004 | 8,38 .330 |
| 11SM23-T | Application requiring gold contacts | 1 Amp N | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 12SM4-T | Best reliability (Bifurcated gold contacts) | 1 Amp N | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,076 .003 | 0,1 .004 | 8,38 .330 |
| 11SM701-T | Lower force | 4 Amps S | 0,56 2 | 0,14 .5 | 0,51 .020 | 0,13 .005 | 0,051 .002 | 8,38 .330 |
| 11SM1-T | Most applications | 5 Amps J | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 11SM3-T | Operating in temperatures to +250°F (121°C) | 5 Amps J | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 11SM244-T | Operating in temperatures to +400°F (204°C) 100 hrs. | 5 Amps * | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 11SM401-T | Less differential travel | 5 Amps K | 0,97 3.5 max. | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,025 .001 | 8,38 .330 |
| 21SM284-T2 (MS25085-2) | MIL-S-8805 application requirements | 5 Amps R | 0,83-1,39 3-5 | 0,28 1 | 0,76 .030 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 21SM284 (MS25085-1) | MIL-S-8805 application requirements, solder terminals | 5 Amps R | 0,83-1,39 3-5 | 0,28 1 | 0,76 .030 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 22SM1-T | Best stability under varying humidity | 5 Amps J | 0,83-1,39 3-5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 41SM1-T | Up to 11 ampere 1/4 hp (AC) load handling | 11 Amps M | 0,83-1,39 3-5 | 0,28 1 | 0,76 .030 | 0,13 .005 | 0,1 .004 | 8,38 .330 |

*For electrical data call 1-800-537-6945

| | | | | | | | | |
|---------|-----------------------------|-------------|--------------------|-----------|--------------|--------------|-------------|--------------|
| 411SM1 | Sealed plunger construction | 5 Amps K | 0,83-2,09 3-7.5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |
| 411SM23 | As above with gold contacts | 1 Amp N | 0,83-2,09 3-7.5 | 0,28 1 | 0,51 .020 | 0,13 .005 | 0,1 .004 | 8,38 .330 |

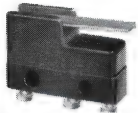
Except where stated * $\pm 0,38\text{mm}$
 $\pm .015\text{ in.}$

Miniature/
Subminiature

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

ORDER GUIDE

INTEGRAL LEVERS



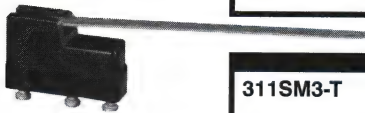
Dim. Dwg. Fig. 4

| Catalog Listing | Description | Electrical Data And UL Code Page 20 | O.F. max. newtons ounces | R.F. max. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|-----------------|--|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|-----------------------|
| 311SM1-T | .285 inch (7,24mm) straight lever | 5 Amps J | 0,39 1.4 | 0,07 .25 | 2,16 .085 | 0,51 .020 | 0,48 .019 | 8,64±1,5 .340±.060 |
| 311SM23-T | As above with gold contacts | 1 Amp N | 0,39 1.4 | 0,07 .25 | 2,16 .085 | 0,51 .020 | 0,48 .019 | 8,64±1,5 .340±.060 |
| 311SM701-T | .285 inch (7,24mm) straight lever. Lower force | 4 Amps S | 0,16 .57 | 0,03 .11 | 2,16 .085 | 0,51 .020 | 0,36 .014 | 8,64±1,5 .340±.060 |



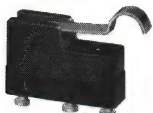
Dim. Dwg. Fig. 5

| | | | | | | | | |
|------------|---|-------------|-------------|-------------|--------------|--------------|--------------|---------------------|
| 311SM2-T | .565 inch (14,35mm) straight lever | 5 Amps J | 0,31 1.1 | 0,05 .18 | 3,05 .120 | 0,66 .026 | 0,69 .027 | 8,51±2 .335±.080 |
| 311SM43-T | As above with gold contacts | 1 Amp N | 0,31 1.1 | 0,05 .18 | 3,05 .120 | 0,66 .026 | 0,69 .027 | 8,51±2 .335±.080 |
| 311SM702-T | .565 inch (14,35mm) straight lever. Lower force | 4 Amps S | 0,11 .4 | 0,02 .07 | 3,05 .120 | 0,66 .026 | 0,38 .015 | 8,51±2 .335±.080 |



Dim. Dwg. Fig. 6

| | | | | | | | | |
|-------------|---|-------------|-------------|-------------|--------------|--------------|--------------|-----------------------|
| 311SM3-T | 1.765 inch (44,8mm) straight lever | 5 Amps J | 0,15 .53 | 0,02 .07 | 7,87 .310 | 1,45 .057 | 2,8 .110 | 7,11±4,3 .280±.170 |
| 311SM17-H58 | As above with gold contacts | 1 Amp N | 0,15 .53 | 0,02 .07 | 7,87 .310 | 1,45 .057 | 2,8 .110 | 7,11±4,3 .280±.170 |
| 311SM703-T | 1.765 inch (44,8mm) straight lever. Lower force | 4 Amps S | 0,06 .2 | 0,01 .04 | 7,87 .310 | 1,45 .057 | 1,78 .070 | 7,11±4,3 .280±.170 |



Dim. Dwg. Fig. 7

| | | | | | | | | |
|------------|--|-------------|-------------|-------------|--------------|--------------|--------------|-----------------------|
| 311SM4-T | .251 inch (6,38mm) simulated roller lever | 5 Amps J | 0,39 1.4 | 0,07 .25 | 2,16 .085 | 0,46 .018 | 0,48 .019 | 11,7±1,5 .460±.060 |
| 311SM25-T | As above with gold contacts | 1 Amp N | 0,39 1.4 | 0,07 .25 | 2,16 .085 | 0,46 .018 | 0,48 .019 | 11,7±1,5 .460±.060 |
| 311SM704-T | .251 inch (6,38mm) simulated roller lever. Lower force | 4 Amps S | 0,16 .57 | 0,03 .11 | 2,16 .085 | 0,46 .018 | 0,33 .013 | 11,7±1,5 .460±.060 |



Dim. Dwg. Fig. 8

| | | | | | | | | |
|------------|--|-------------|-------------|-------------|--------------|--------------|--------------|----------------------|
| 311SM5-T | .535 inch (13,6mm) simulated roller lever | 5 Amps J | 0,31 1.1 | 0,05 .18 | 3,05 .120 | 0,66 .026 | 0,69 .027 | 11,56±2 .455±.080 |
| 311SM705-T | .535 inch (13,6mm) simulated roller lever. Lower force | 4 Amps S | 0,11 .4 | 0,02 .07 | 3,05 .120 | 0,66 .026 | 0,38 .015 | 11,56±2 .455±.080 |



Dim. Dwg. Fig. 9

| | | | | | | | | |
|------------|--|-------------|-------------|-------------|--------------|--------------|--------------|-----------------------|
| 311SM6-T | .251 inch (6,38mm) roller lever | 5 Amps J | 0,39 1.4 | 0,07 .25 | 2,16 .085 | 0,46 .018 | 0,48 .019 | 14,2±1,5 .560±.060 |
| 311SM68-T | As above with gold contacts | 1 Amp N | 0,39 1.4 | 0,07 .25 | 2,16 .085 | 0,46 .018 | 0,48 .019 | 14,2±1,5 .560±.060 |
| 311SM706-T | .251 inch (6,38mm) roller lever. Lower force | 4 Amps S | 0,16 .57 | 0,03 .11 | 2,16 .085 | 0,46 .018 | 0,33 .013 | 14,2±1,5 .560±.060 |



Dim. Dwg. Fig. 10

| | | | | | | | | |
|----------|---------------------------------|-------------|-------------|-------------|--------------|--------------|--------------|---------------------|
| 311SM7-T | .535 inch (13,6mm) roller lever | 5 Amps J | 0,31 1.1 | 0,05 .18 | 3,05 .120 | 0,66 .026 | 0,69 .027 | 14,1±2 .555±.080 |
|----------|---------------------------------|-------------|-------------|-------------|--------------|--------------|--------------|---------------------|

INTEGRAL LEAF



Dim. Dwg. Fig. 11

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 20 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|-----------------|---|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|------------------------|
| 111SM1-T | Force and stability of flexible leaf actuator | 5 Amps J | 1,95 7 | 0,56 2 | 5,54 .218 | 0,76 .030 | 0,76 .030 | 8,89±0,76 .350±.030 |
| 111SM17-T | As above with gold contacts | 1 Amp N | 1,95 7 | 0,56 2 | 5,54 .218 | 0,76 .030 | 0,76 .030 | 8,89±0,76 .350±.030 |



Dim. Dwg. Fig. 12

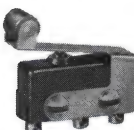
| | | | | | | | | |
|-----------|-----------------------------|-------------|-----------|-----------|--------------|--------------|--------------|------------------------|
| 111SM2-T | Flexible leaf with roller | 5 Amps J | 1,95 7 | 0,56 2 | 5,56 .219 | 0,76 .030 | 0,64 .025 | 14,3±0,76 .562±.030 |
| 111SM23-T | As above with gold contacts | 1 Amp N | 1,95 7 | 0,56 2 | 5,56 .219 | 0,76 .030 | 0,64 .025 | 14,3±0,76 .562±.030 |

AUXILIARY ACTUATORS

Switches are not included with the actuators.



Dim. Dwg. Fig. 14



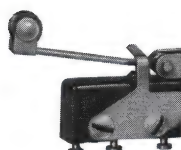
Dim. Dwg. Fig. 14



Dim. Dwg. Fig. 14



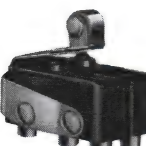
Dim. Dwg. Fig. 16



Dim. Dwg. Fig. 16



Dim. Dwg. Fig. 16



Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position; F.P. — Free Position

* All characteristics are taken with actuator assembled to Catalog Listing 11SM3-T as shown.

ORDER GUIDE

| Catalog Listing | Description | Actuator Length "A" mm inches | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches | F.P. max. mm inches |
|-----------------|---------------|-------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|------------------------|---------------------|
| JS-2 | Straight leaf | 16,8 .66 | 2,78 10 | 0,56 2 | 1,98 .078 | 0,38 .015 | 0,38 .015 | 8,89±0,38 .350±.015 | 11,3 .445 |

| | | | | | | | | | |
|------|-----------------------------|-----------|------------|-----------|--------------|--------------|--------------|------------------------|--------------|
| JS-5 | Roller leaf (Bronze roller) | 15 .59 | 2,78 10 | 0,83 3 | 1,98 .078 | 0,38 .015 | 0,38 .015 | 14,2±0,38 .580±.015 | 16,9 .665 |
|------|-----------------------------|-----------|------------|-----------|--------------|--------------|--------------|------------------------|--------------|

| | | | | | | | | | |
|------|--------------------------------|-------------|------------|-----------|--------------|--------------|--------------|------------------------|--------------|
| JS-7 | Formed leaf (Simulated roller) | 14,7 .58 | 2,78 10 | 0,56 2 | 2,39 .094 | 0,79 .031 | 0,38 .015 | 9,65±0,38 .380±.015 | 12,1 .475 |
|------|--------------------------------|-------------|------------|-----------|--------------|--------------|--------------|------------------------|--------------|

| | | | | | | | | | |
|--------|----------------|---------------|-----------|-------------|----------------------|--------------|--------------|----------------------|---|
| JS-220 | Straight lever | 26,2† 1.03 | 0,28 1 | 0,04 .14 | 3,18 .125 approx. | 0,76 .030 | 0,76 .030 | 10,3 .406 approx. | — |
|--------|----------------|---------------|-----------|-------------|----------------------|--------------|--------------|----------------------|---|

| | | | | | | | | | |
|--------|-----------------------------|---------------|-----------|-------------|----------------------|--------------|--------------|----------------------|---|
| JS-246 | Roller lever (Steel roller) | 25,4† 1.00 | 0,28 1 | 0,04 .14 | 3,18 .125 approx. | 0,76 .030 | 0,76 .030 | 14,3 .562 approx. | — |
|--------|-----------------------------|---------------|-----------|-------------|----------------------|--------------|--------------|----------------------|---|

| | | | | | | | | | |
|--------|---------------------------------|---------------|-----------|-------------|----------------------|--------------|--------------|----------------------|---|
| JS-221 | Formed lever (Simulated roller) | 25,4† 1.00 | 0,28 1 | 0,04 .14 | 3,18 .125 approx. | 0,76 .030 | 0,76 .030 | 11,6 .455 approx. | — |
|--------|---------------------------------|---------------|-----------|-------------|----------------------|--------------|--------------|----------------------|---|

| | | | | | | | | | |
|---------|-------------|------------|------------|------------|--------------|--------------|--------------|------------------------|--------------|
| JS-33** | Tandem leaf | 5,3 .21 | 5,00 18 | 2,78 10 | 2,36 .093 | 0,15 .006 | 0,38 .015 | 8,89±0,38 .350±.015 | 10,5 .415 |
|---------|-------------|------------|------------|------------|--------------|--------------|--------------|------------------------|--------------|

| | | | | | | | | | |
|---------|------------------------------------|------------|------------|------------|--------------|--------------|--------------|------------------------|--------------|
| JS-31** | Tandem roller leaf (Bronze roller) | 4,3 .17 | 11,1 40 | 4,45 16 | 2,36 .093 | 0,13 .005 | 0,38 .015 | 14,5±0,38 .570±.015 | 16,1 .635 |
|---------|------------------------------------|------------|------------|------------|--------------|--------------|--------------|------------------------|--------------|

**Travel characteristics on tandem actuators vary with actual basic switch characteristics.

NOTE: Above actuators should be used below +300°F.

See page 79 for other actuators that may be used with SM Switches at higher temperatures.

†"A" measurement is from the pivot point of lever to the point indicated on drawing.

Basic Switches

Subminiature

SM Series

MOUNTING DIMENSIONS (for reference only)

PIN PLUNGER

OPERATING POSITION

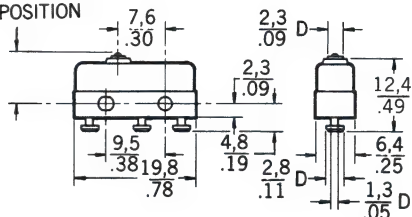


Fig. 1

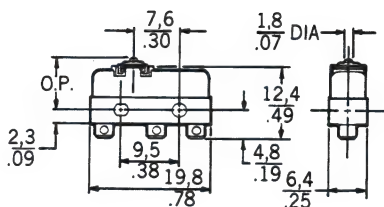


Fig. 2

INTEGRAL LEVERS

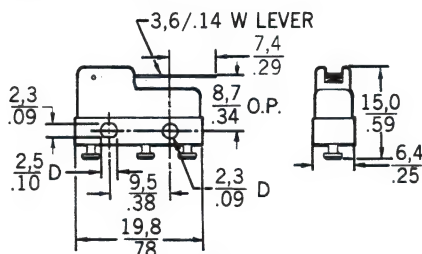


Fig. 4

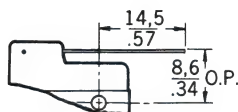


Fig. 5



Fig. 6

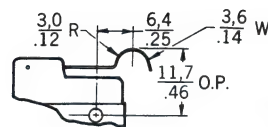


Fig. 7

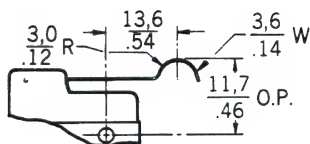


Fig. 8

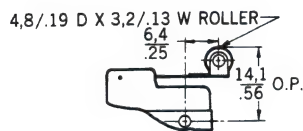


Fig. 9

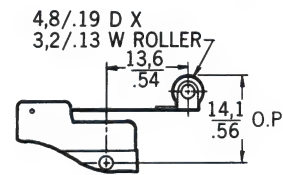


Fig. 10

INTEGRAL LEAFS

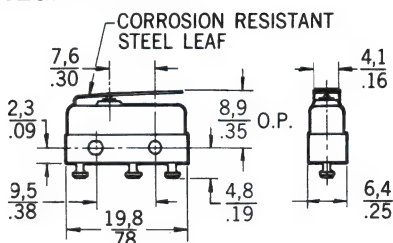


Fig. 11

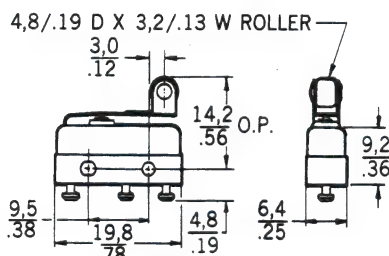


Fig. 12

Mounting holes accept pins or screws of .087 inch (2.21 mm) max. diameter

Key: $\frac{0.0}{0.00} = \text{mm}$
 $\frac{0.00}{0.00} = \text{inches}$

AUXILIARY ACTUATORS

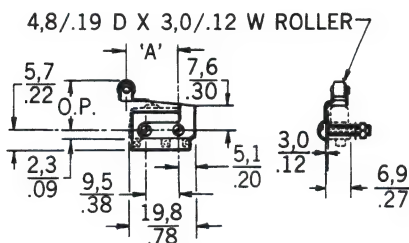


Fig. 14

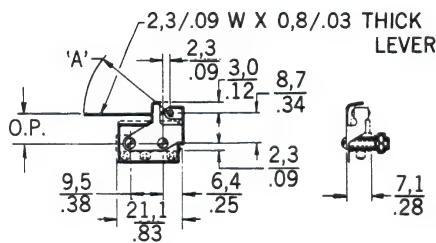


Fig. 16

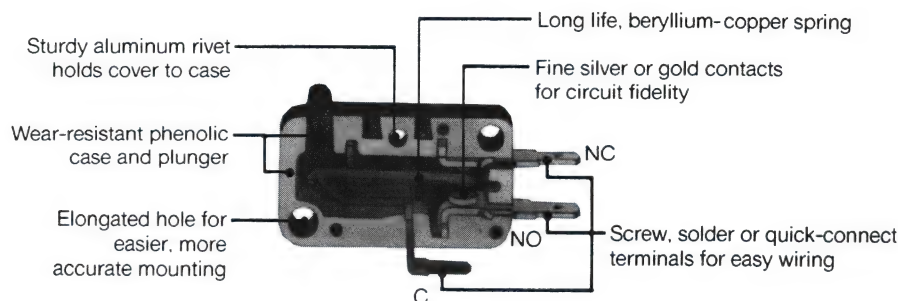
Switches are not included with the actuators.

Basic Switches

Miniature

V3 Series

CUT-A-WAY V3 MINIATURE BASIC SWITCH



GENERAL INFORMATION

V3 miniature basic switches feature high electrical capacity and long life. Their size and shape meet design requirements in all types of applications.

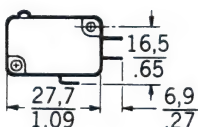
There is a choice of SPDT, SPNC, and SPNO circuitry. Many lever styles, contact materials, and terminal variations can be furnished. Contact the 800 number for ordering information.

FEATURES

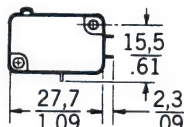
- Low operating force to .53 ounce maximum
- Sensitive differential travel as low as .006 inch maximum
- Power load switching capability up to 25 amperes—silver contacts
- Gold alloy crosspoint, silver cadmium, and other contact material for special applications
- Long mechanical life of 10,000,000 cycles—95% survival for V3-100, V3-1100, V3-2100, V3-3000 Series
- Temperature tolerance up to +180°F (82°C) on standard construction
- High temperature construction for use up to +600°F (316°C)
- 3,1 mm mounting holes available
- UL recognized File #E12252, CSA certified File #LR41370

AVAILABLE TERMINALS

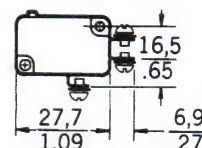
SOLDER



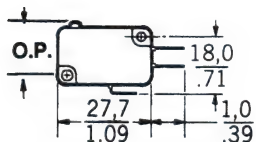
SHORT SOLDER



SCREW



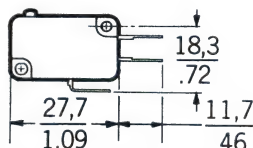
D8



.188 wide x .020 thick terminals

QUICK CONNECT

D9



.250 wide x .032 thick terminals

Dimensions shown are for reference only

Key: 0.0 = mm
0.00 = inches

Mounting torque:
2 inch pounds min.
5 inch pounds max.

This section covers only **60** of our most popular V3 Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **850** other active V3 listings will meet your needs. Contact the 800 number.

Basic Switches

Miniature

V3 Series

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

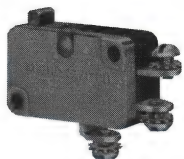
PIN PLUNGERS



Dim. Dwg. Fig. 1

ORDER GUIDE by ascending electrical capability

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 20 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.** mm inches |
|-----------------|---|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|-------------------------|------------------|
| V3-343-D8 | General use. Gold alloy crosspoint contacts. | 1 Amp X | 2,22 8 max. | 0,56 2 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-2451-D8 | Lowest force. | 3 Amps VV | 0,15 .53 | — | 1,2 .047 | 1,27 .050 | 0,051-0,25 .002-.010 | 14,7 .578 |
| V3-2401-D8 | Lower force. | 5 Amps YY | 0,24 .9 | — | 1,2 .047 | 1,27 .050 | 0,051-0,25 .002-.010 | 14,7 .578 |
| V3-70101-D8 | Most 5 amp applications. | 5 Amps ZZ | 2,22 8 | 0,56 2 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-1101-D8 | General use. | 10 Amps TT | 0,72 max. 2.6 | 0,10 .35 | 1,2 .047 | 1,27 .050 | 0,051-0,25 .002-.010 | 14,7 .578 |
| V3-2101-D8 | Low force. | 10 Amps V | 0,50 max. 1.8 | 0,05 .18 | 1,2 .047 | 1,27 .050 | 0,051-0,25 .002-.010 | 14,7 .578 |
| V3-101-D8 | Higher force. Most applications. | 11 Amps T | 2,22 8 max. | 0,56 2 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-1-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 1,67-3,89 6-14 | 1,11 4 | 1,21 .047 | 1,0 .040 | 0,15-0,4 .006-.016 | 14,7 .578 |
| V3-3001-D8 | High force. Up to 15.1 amps load handling. | 15.1 Amps U | 1,47 max. 5.3 | 0,15 .53 | 1,2 .047 | 1,27 .050 | 0,051-0,25 .002-.010 | 14,7 .578 |
| V3-2800-D9 | Up to 20 amps load handling | 20 Amps AA | 0,63 - 1,22 2.3 - 4.4 | 0,20 0.7 | 1,2 .047 | 1,27 .050 | 0,25 .010 max. | 14,7 .578 |
| V3-2900-D9 | Up to 25 amps load handling | 25 Amps BB | 1,22 - 2,20 4.4 - 7.9 | 0,31 1.1 | 1,2 .047 | 1,27 .050 | 0,25 .010 max. | 14,7 .578 |



Dim. Dwg. Fig. 2

| | | | | | | | | |
|---------------------|--|------------|--------------------|-----------|-------------|--------------|------------------------|--------------|
| V3-1001 (MS25253-1) | MIL-S-8805 application requirements (SPDT) | 10 Amps UU | 1,67-3,89 6-14 | 1,11 4 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-1002 (MS25253-3) | MIL-S-8805 application requirements (SPNC) | 10 Amps UU | 1,67-3,89 6-14 | 1,11 4 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-1003 (MS25253-2) | MIL-S-8805 application requirements (SPNO) | 10 Amps UU | 1,67-3,89 6-14 | 1,11 4 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-129* | Operating in temperature to +302°F (150°C) | 11 Amps T | 2,22 8 max. | 0,56 2 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |
| V3-245* | Operating in temperature to +400°F (204°C) | 10 Amps W | 2,78-6,95 10-25 | 1,67 6 | 1,2 .047 | 1,02 .040 | 0,15-0,41 .006-.016 | 14,7 .578 |

*For actuators, contact MICRO SWITCH Sales Office.

**Tolerances ±0.38
±0.15

ORDER GUIDE

SIMULATED ROLLER



Dim. Dwg. Fig. 3

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 20 | Length of Lever "A" mm inches | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|-----------------|---|-------------------------------------|-------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|-----------------|
| V3L-1123-D8 | General use. | 10 Amps TT | 32,6 1.285 | 0,39 1.4 | 0,05 .18 | 2,54 .100 | 2,03 .080 | 0,76 .030 | 18,5 .730 |
| V3L-2105-D8 | Low force. | 10 Amps V | 32,6 1.285 | 0,33 1.2 | 0,02 .07 | 2,54 .100 | 2,03 .080 | 0,76 .030 | 18,5 .730 |
| V3L-121-D8 | High force. Most applications. | 11 Amps T | 32,6 1.285 | 1,11 4 | 0,14 .5 | 3,18 .125 | 1,57 .062 | 0,81 .032 | 18,5 .730 |
| V3L-5-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 32,6 1.285 | 2,22 8 | 0,28 1 | 3,18 .125 | 1,57 .062 | 0,81 .032 | 18,5 .730 |
| V3L-3014-D8 | High force. Up to 15.1 amps load handling. | 15.1 Amps U | 32,6 1.285 | 0,94 3.4 | 0,07 .25 | 2,54 .100 | 1,90 .075 | 0,76 .030 | 18,5 .730 |

*±1.5 mm
±.060 in.

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pre-travel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

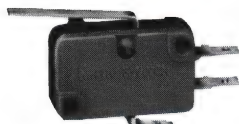
ORDER GUIDE

STRAIGHT LEVERS



Dim. Dwg. Fig. 4

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 20 | Length of Lever "A" mm inches | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|--------------------|---|-------------------------------------|-------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|-------------------------------|
| V3L-1105-D8 | General use. | 10 Amps TT | 21,3 .860 | 0,72 2.6 | 0,10 .35 | 1,5 .060 | 1,14 .045 | 0,33 .013 | 15,2±0,51 .600±.020 |
| V3L-2101-D8 | Low force. Added overtravel. | 10 Amps V | 21,3 .860 | 0,50 1.8 | 0,50 .18 | 1,5 .060 | 1,14 .045 | 0,33 .013 | 15,2±0,51 .600±.020 |
| V3L-101-D8 | Higher force. Most applications. | 11 Amps T | 21,3 .860 | 2,50 9 | 0,56 2 | 1,5 .060 | 1,02 .040 | 0,41 .016 | 15,2±0,51 .600±.020 |
| V3L-1-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 21,3 .860 | 3,89 14 | 0,83 3 | 1,5 .060 | 1,02 .040 | 0,41 .016 | 15,2±0,51 .600±.020 |
| V3L-3001-D8 | High force. Up to 15.1 amps load handling. | 15.1 Amps U | 21,3 .860 | 1,47 5.3 | 0,15 .53 | 1,5 .060 | 1,02 .040 | 0,28 .011 | 15,2±0,51 .600±.020 |



Dim. Dwg. Fig. 4

| | | | | | | | | | |
|--------------------|---|--------------------|---------------------|--------------------|--------------------|---------------------|---------------------|---------------------|------------------------------|
| V3L-1108-D8 | General use. | 10 Amps TT | 35,6 1.40 | 0,39 1.4 | 0,04 .14 | 2,79 .110 | 2,29 .090 | 0,76 .030 | 15,2±1,5 .600±.060 |
| V3L-2102-D8 | Low force. | 10 Amps V | 35,6 1.40 | 0,31 1.1 | 0,02 .07 | 2,79 .110 | 2,29 .090 | 0,76 .030 | 15,2±1,5 .600±.060 |
| V3L-104-D8 | Higher force. Most applications. | 11 Amps T | 35,6 1.40 | 1,11 4 | 0,14 .5 | 3,18 .125 | 2,29 .090 | 1,27 .050 | 15,2±1,5 .600±.060 |
| V3L-2-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 35,6 1.40 | 2,22 8 | 0,28 1 | 3,18 .125 | 2,29 .090 | 1,27 .050 | 15,2±1,5 .600±.060 |
| V3L-3005-D8 | High force. Up to 15.1 amps load handling. | 15.1 Amps U | 35,6 1.40 | .86 3.1 | 0,06 .21 | 3,05 .120 | 2,29 .090 | 0,81 .032 | 15,2±1,5 .600±.060 |



Dim. Dwg. Fig. 4

| | | | | | | | | | |
|--------------------|---|--------------------|---------------------|--------------------|--------------------|---------------------|---------------------|---------------------|-------------------------------|
| V3L-2425-D8 | Lower force. | 5 Amps YY | 59,4 2.34 | 0,07 .25 | — | 5,08 .200 | 4,06 .160 | 1,4 .055 | 15,2±2 .600±.080 |
| V3L-1122-D8 | General use. | 10 Amps TT | 59,4 2.34 | 0,22 .81 | 0,02 .07 | 5,08 .200 | 4,06 .160 | 1,4 .055 | 15,2±1,8 .600±.070 |
| V3L-2106-D8 | Low force. | 10 Amps V | 59,4 2.34 | 0,16 .56 | 0,01 .04 | 5,08 .200 | 4,06 .160 | 1,4 .055 | 15,2±1,8 .600±.070 |
| V3L-131-D8 | Higher force. Most applications. | 11 Amps T | 59,4 2.34 | 0,58 2.1 | 0,12 .42 | 6,6 .260 | 3,81 .150 | 2,29 .090 | 14,7±2 .580±.080 |
| V3L-6-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 59,4 2.34 | 1,11 4 | 0,14 .50 | 6,95 2.60 | 3,81 .150 | 2,29 .090 | 14,35±1,5 .565±.060 |
| V3L-3013-D8 | High force. Up to 15.1 amps load handling. | 15.1 Amps U | 59,4 2.34 | 0,39 1.4 | 0,03 .11 | 5,33 .210 | 4,06 .160 | 1,52 .060 | 15,2±1,9 .600±.075 |



Dim. Dwg. Fig. 4

| | | | | | | | | | |
|--------------------|---|--------------------|----------------------|---------------------|--------------------|---------------------|---------------------|---------------------|--------------------------------|
| V3L-2472-D8 | Lowest force. | 3 Amps VV | 69,45 2.75 | 0,03 .11 | — | 5,97 .235 | 5,08 .200 | 1,60 .063 | 15,2±2,54 .600±.100 |
| V3L-1124-D8 | General use. | 10 Amps TT | 69,45 2.75 | 0,19 .70 | 0,01 .04 | 7,74 .305 | 3,68 .145 | 1,65 .065 | 15,31±2,54 .603±.100 |
| V3L-145-D8 | Most applications. | 11 Amps T | 69,45 2.75 | 0,54 1.93 | 0,10 .36 | 0,76 .300 | 4,57 .180 | 2,54 .100 | 14,48±2,03 .570±.080 |
| V3L-14-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 69,45 2.75 | 0,83 3 | 0,14 .50 | 8,38 .330 | 4,32 .170 | 2,54 .100 | 13,72±2,03 .540±.080 |

ROLLER LEVERS



Dim. Dwg. Fig. 7



Dim. Dwg. Fig. 7

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data And UL Codes Page 20 | Length of Lever "A" mm inches | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|-----------------|---|--------------------------------------|-------------------------------|--------------------------|--------------------------|---------------------|---------------------|----------------------------|------------------------|
| V3L-1117-D8 | General use. | 10 Amps TT | 20,6 .81 | 0,89 3.2 | 0,10 .35 | 1,2 .047 | 1,14 .045 | 0,33 .013 | 20,6±0,76 .810±.030 |
| V3L-2103-D8 | Low force. | 10 Amps V | 20,6 .81 | 0,58 2.1 | 0,03 .11 | 1,42 .056 | 0,86 .034 | 0,33 .013 | 20,6±0,76 .810±.030 |
| V3L-139-D8 | Higher force. Most applications. | 11 Amps T | 20,6 .81 | 2,22 8 | 0,56 2 | 1,5 .060 | 1,02 .040 | 0,41 .016 | 20,6±0,76 .810±.030 |
| V3L-3-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 20,6 .81 | 3,89 14 | 0,83 3 | 1,52 .060 | 1,02 .040 | 0,41 .016 | 20,6±0,76 .810±.030 |
| V3L-3003-D8 | High force. Up to 15.1 amps load handling. | 15.1 Amps U | 20,6 .81 | 1,89 6.8 | 0,15 .53 | 1,2 .047 | 1,02 .040 | 0,05 - 0,25 .002 - .010 | 20,6±0,76 .810±.030 |

| | | | | | | | | | |
|-------------|---|-------------|------------|-------------|-------------|--------------|--------------|--------------|-----------------------|
| V3L-1101-D8 | General use. | 10 Amps TT | 34 1.34 | 0,44 1.6 | 0,04 .14 | 3,18 .125 | 2,16 .085 | 0,76 .030 | 20,6±1,5 .810±.060 |
| V3L-2104-D8 | Low force. | 10 Amps V | 34 1.34 | 0,31 1.1 | 0,02 .07 | 3,18 .125 | 2,16 .085 | 0,76 .030 | 20,6±1,5 .810±.060 |
| V3L-111-D8 | Higher force. Most applications. | 11 Amps T | 34 1.34 | 1,11 4 | 0,14 .5 | 3,18 .125 | 2,16 .085 | 1,27 .050 | 20,6±1,5 .810±.060 |
| V3L-4-D8 | Highest force. Up to 15.1 amps load handling with reduced life. | 15.1 Amps U | 34 1.34 | 2,22 8 | 0,28 1 | 3,18 .125 | 2,16 .085 | 1,27 .050 | 20,6±1,5 .810±.060 |
| V3L-3004-D8 | Higher force. Up to 15.1 amps load handling. | 15.1 Amps U | 34 1.34 | 0,89 3.2 | 0,14 .5 | 3,18 .125 | 2,16 .085 | 0,76 .030 | 20,6±1,5 .810±.060 |

Characteristics: O.F. — Operating Force; O.T. — Overtravel; D.T. — Differential Travel; R.F. — Release Force; P.T. — Pretravel; O.P. — Operating Position; F.P. — Free Position.

* Characteristics taken with actuator assembled on Catalog Listing V3-1 switch as shown.

AUXILIARY ACTUATORS



Dim. Dwg. Fig. 11



Dim. Dwg. Fig. 11



Dim. Dwg. Fig. 11

ORDER GUIDE - SWITCHES ARE NOT INCLUDED WITH ACTUATORS

| Catalog Listing | Description | Actuator Length "A" mm inches | O.F. max newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches | F.P. max. mm inches |
|-----------------|-------------|-------------------------------|-------------------------|--------------------------|---------------------|---------------------|---------------------|----------------------|---------------------|
| JV-1 | Leaf type | 21,3 .84 | 3,34 12 | 1,11 4 | 1,19 .047 | 0,79 .031 | 0,41 .016 | 15±0,38 .590±.015 | 16,4 .645 |

| | | | | | | | | | |
|------|-----------|--------------|-----------|-----------|--------------|--------------|--------------|------------------------|--------------|
| JV-7 | Long leaf | 32,3 1.27 | 2,50 9 | 1,11 4 | 1,57 .062 | 1,27 .050 | 0,64 .025 | 14,5±0,76 .570±.030 | 17,4 .685 |
|------|-----------|--------------|-----------|-----------|--------------|--------------|--------------|------------------------|--------------|

| | | | | | | | | | |
|------|-------------|-------------|------------|-----------|--------------|--------------|--------------|------------------------|--------------|
| JV-5 | Roller leaf | 20,6 .81 | 3,34 12 | 1,11 4 | 1,52 .060 | 0,79 .031 | 0,41 .016 | 20,3±0,64 .800±.025 | 22,1 .870 |
|------|-------------|-------------|------------|-----------|--------------|--------------|--------------|------------------------|--------------|

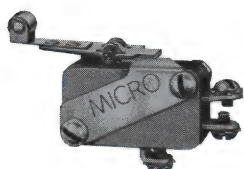
NOTE: Contact a MICRO SWITCH Sales Office for application assistance when actuators will be used at temperatures above 300°F (149°C).

AUXILIARY ACTUATORS

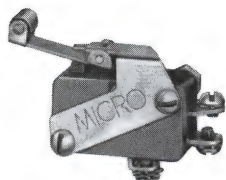
Switches are not included with actuators



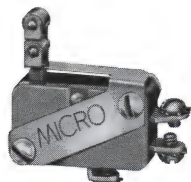
Dim. Dwg. Fig. 14



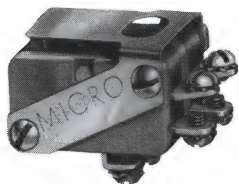
Dim. Dwg. Fig. 14



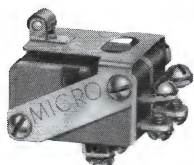
Dim. Dwg. Fig. 14



Dim. Dwg. Fig. 11



Dim. Dwg. Fig. 17



Dim. Dwg. Fig. 17

Characteristics: O.F. — Operating Force;
R.F. — Release Force; P.T. — Pretravel;
O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position; F.P. — Free Position
* Characteristics taken with actuator assembled on Catalog Listing V3-100 switch as shown.

ORDER GUIDE - SWITCHES ARE NOT INCLUDED WITH ACTUATORS

| Catalog Listing | Description | Actuator Length "A" mm inches | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches | F.P. max. mm inches |
|-----------------|-------------|-------------------------------------|--------------------------------|--------------------------------|---------------------------|---------------------------|---------------------------|------------------------|---------------------------|
| JV-26 | Long lever | 44,5† 1.75 | 0,39 1.4 | 0,06 .21 | 8,33 .328 | 3,58 .141 | 4,75 .187 | 12,7±3,18 .500±.125 | — |

| | | | | | | | | | |
|-------|--------------|---------------|-----------|------------|--------------|--------------|--------------|-----------------------|--------------|
| JV-20 | Roller lever | 19,1† .750 | 0,83 3 | 0,14 .5 | 4,78 .188 | 1,57 .062 | 1,98 .078 | 19,5±1,4 .766±.055 | 23,8 .936 |
|-------|--------------|---------------|-----------|------------|--------------|--------------|--------------|-----------------------|--------------|

| | | | | | | | | | |
|--------|--------------|---------------|-----------|------------|--------------|--------------|--------------|-----------------------|--------------|
| JV-220 | Roller lever | 17,7† .695 | 0,83 3 | 0,14 .5 | 4,78 .188 | 1,57 .062 | 1,98 .078 | 19,5±1,1 .766±.045 | 23,8 .936 |
|--------|--------------|---------------|-----------|------------|--------------|--------------|--------------|-----------------------|--------------|

| | | | | | | | | | |
|-------|----------------------|-------------|------------|-----------|--------------|--------------|--------------|-------------------------|--------------|
| JV-30 | One-way roller lever | 20,6 .81 | 3,34 12 | 1,11 4 | 2,03 .080 | 0,51 .020 | 0,38 .015 | 25,7±0,76 1.010±.030 | 27,7 1.09 |
|-------|----------------------|-------------|------------|-----------|--------------|--------------|--------------|-------------------------|--------------|

| | | | | | | | | | |
|---------|-------------|-------------|------------|-----------|--------------|--------------|---|------------------------|--------------|
| JV-91** | Tandem leaf | 20,6 .81 | 5,00 18 | 1,67 6 | 1,57 .062 | 0,89 .035 | — | 14,9±0,76 .588±.030 | 16,5 .650 |
|---------|-------------|-------------|------------|-----------|--------------|--------------|---|------------------------|--------------|

| | | | | | | | | | |
|---------|--------------------|-------------|------------|-----------|--------------|--------------|---|------------------------|--------------|
| JV-82** | Tandem roller leaf | 20,6 .81 | 5,00 18 | 1,67 6 | 1,57 .062 | 0,89 .035 | — | 20,5±0,76 .806±.030 | 21,8 .860 |
|---------|--------------------|-------------|------------|-----------|--------------|--------------|---|------------------------|--------------|

NOTE: Contact the 800 number for application assistance when actuators will be used at temperatures above 300°F (149°C).

** Travel characteristics on tandem actuators vary with actual basic switch characteristics. These shown are typical for the assembly.

† "A" measurement is from the pivot point of lever to the point indicated on drawing.

V3 Series

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 7

Fig. 11

Fig. 14

Fig. 17



FEATURES

- Quick-connect and printed wiring board termination
- Proven V3 switching mechanism
- Physically interchangeable with existing V3 switches
- All existing V3 lever options available
- UL recognized File # E12252; CSA certified File # LR41370
- International listings carry VDE approval
- Power load switching capability up to 21 amps
- Temperature tolerance -40° to 185°F (-40° to 85°C)
- High temperature construction available—350°F

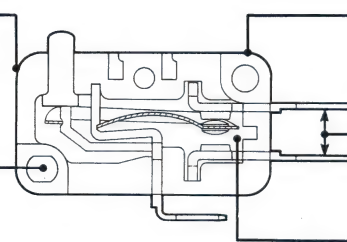
APPLICABLE EUROPEAN SYMBOLS

- μ = microgap construction. (The measurement between open contacts is less than 3mm).**
- \sim = alternating current (used with value of voltage source: 250V \sim).
- T = maximum rated use temperature; followed by the temperature value in °C (example T 85).
- +++ = switch is rated for at least 50,000 cycles at its rated current. (Sometimes referred to as "frequent" operation.)
- 10(3) = first number represents resistive rating. Second number represents inductive (motor) rating.

CUTAWAY V7 MINIATURE BASIC SWITCH

Thermoplastic material meets KC 250 arc tracking test per VDC 0630, DIN 53 480, and UL94V-0.

Mounting hole size options for #4 or 3mm screw.



4mm (min) spacing between current carrying parts and mounting hardware.

"E" terminals designed to provide 3mm (min.) spacing with uninsulated receptacles installed. Terminals meet DIN 46 244 dimensions.

Internal construction meet 3mm (min.) creepage and clearance requirement.

GENERAL INFORMATION

The V7 Series is available in two versions, the Timesaver series and the International series. The Timesaver series is UL recognized and CSA certified. Timesaver series switches use readily available high-volume components to provide especially responsive delivery performance. The International V7 provides VDE approval in addition to UL recognition and CSA certification.

The V7 offers a choice of four quick-connect and two printed wiring board terminal types. Three quick-connect types are offset to meet international 3mm spacing requirements and one is designed for use with molded connectors. Contact material choice includes gold alloy, silver alloy or silver for handling various electrical loads. There are two mounting hole sizes available. Standard .114" or 3mm to meet European design requirements.

Terminal variations and switch dimensions of the European designed version conform to applicable DIN standards. These V7s mate with both standard domestic and international industry stan-

dard receptacles and connectors. The plastic enclosure meets VDE KC250 arc tracking requirement and is approvable under the Refrigeration Industry Taste and Odor test.

OPERATING FORCES

- 175 grams (V rating only)
- 150 grams (Not applicable to Electrical Rating V)
- 75 grams (Not applicable to Electrical Rating C or V)
- 50 grams (Not applicable to Electrical Rating B, C, V)
- 25 grams (Not applicable to Electrical Rating B, C, E, V)
- 15 grams (Not applicable to Electrical Rating A, B, C, E, S, V)

Mounting Torque:
2 inch pounds min.
5 inch pounds max.

ELECTRICAL RATINGS

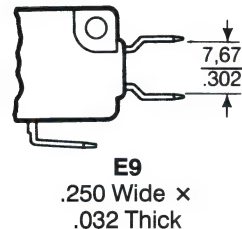
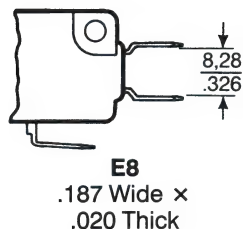
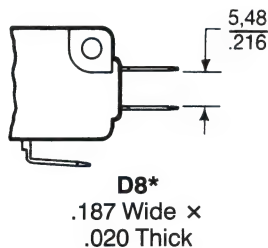
| A | B | C* | D | E | F | S | V |
|---|--|--|----------------|--|---|-----------------|---|
| 5 amps, 125, 250 or 277 VAC; 1/10 hp, 250 VAC | 11 amps and 1/8 hp, 125, 250 or 277 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 4 amps, 125 VAC "L" | 15.1 amps and 1/2 hp, 125, 250 or 277 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 5 amps, 120 VAC "L" | 1 amp, 125 VAC | 10 amps and 1/8 hp 125 or 250 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 4 amps, 125 VAC "L" | 3 amps, 125, 250 or 277 VAC; 1/10 hp, 250 VAC | .1 amp, 125 VAC | 21 amps 125, 250 or 277 VAC, 1 HP 125, 250, 277 VAC; 2 HP, 250, 277 VAC |
| W | X | | | | | | |
| 15.1 amps, 125, 250 or 277 VAC | 6 amps; 1/8 HP 125, 250 or 277 VAC | | | | | | |
| International Series Only | | | | | | | |
| 10 (3) +++ 250V ~ T 85 μ | | | | 5 (2) +++ 250V ~ T 85 μ | | +++ | 16 (4) 250V ~ T 85 μ 50E3 SPNO only |

* Available only when specifying 150 gram operating force.
NOTE: "L" denotes lamp load.

**The microgap construction (M) means contact gap is less than 3mm. Therefore, these products are suitable for secondary circuit use but not primary circuit use which requires a 3mm gap.

AVAILABLE TERMINALS

Quick-connect



NOTE: D8 and E8 terminals are European approved when used with electrical ratings B, D, or E. E9 terminals are European approved when used with electrical ratings B, C, D, or E.

* International approving agencies will require that switches with these terminals have insulated receptacles or connector.

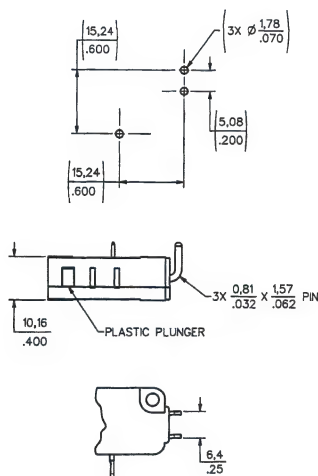
Printed Wiring Board

Printed wiring board terminals interface with snap-on receptacles and other components from AMPMODU interconnection system.

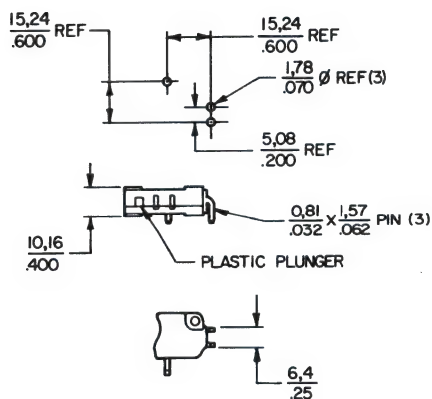
Dimensions shown are for reference only.

Key: $\frac{0,0}{0.00} = \text{mm}$
 $\frac{0.00}{0.00} = \text{inches}$

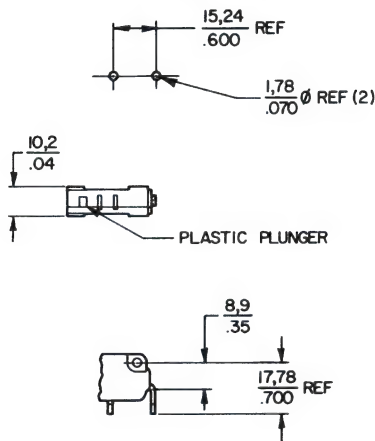
PO1



PO2



PO7



This section covers only **48** of our most popular V7 Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **300** other active V7 listings will meet your needs. Contact the 800 number.

TIMERSAVER SERIES

PIN PLUNGERS



Dim. Dwg. Fig. 1

ORDER GUIDE - SPDT*

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel.

| Catalog Listing | Elect. Rating P. 38 | O.F. max. grams ounces | R.F. min. grams ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches |
|-----------------|------------------------|------------------------|------------------------|---------------------|---------------------|------------------------|
| V7-1S17D8 | 1 Amp S | 150 5.3 | 25 .88 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-3S17E9 | 1 Amp S | 50 1.75 | 5 .175 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-3A17E9 | 5 Amps A | 50 1.75 | 5 .175 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-2B17D8 | 11 Amps B | 75 2.63 | 10 .35 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-2B17E9 | 11 Amps B | 75 2.63 | 10 .35 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-1C17D8 | 15.1 Amps C | 150 5.3 | 25 .88 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-9W1AE9 | 15.1 Amps W (350°F) | 300 10.6 | 25 .88 | 1,19 .047 | 1,27 .050 | 0,25 .010 max. |
| V7-1V19E9 | 21 Amps V | 175 6.1 | 20 .70 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |

STRAIGHT LEVERS



Dim. Dwg. Fig. 2

ORDER GUIDE - SPDT* .87" LEVER TIMESAVER SERIES

| | | | | | | |
|---------------|----------------|------------|-----------|--------------|--------------|--------------|
| V7-3S17D8-002 | 1 Amp S | 54 1.9 | 3 .11 | 1,52 .060 | 0,89 .035 | 0,33 .013 |
| V7-1A17D8-002 | 5 Amps A | 160 5.6 | 7 .25 | 1,52 .060 | 0,89 .035 | 0,38 .015 |
| V7-2B17D8-002 | 11 Amps B | 80 2.8 | 5 1.76 | 1,52 .060 | 0,89 .035 | 0,38 .015 |
| V7-1C17E9-002 | 15.1 Amps C | 160 5.6 | 17 .60 | 1,52 .060 | 0,89 .35 | 0,36 .014 |
| V7-1V19E9-002 | 21 Amps V | 185 6.5 | 13 .5 | 1,65 .065 | 0,89 .035 | 0,38 .015 |

1.40" LEVER TIMESAVER SERIES

| | | | | | | |
|---------------|---------------------|------------|------------|--------------|--------------|--------------|
| V7-3S17D8-022 | 1 Amp S | 30 1.05 | 1 0.035 | 3,04 .120 | 2,16 .085 | 0,76 .030 |
| V7-1A17E9-022 | 5 Amps A | 85 3 | 8 .28 | 3,04 .120 | 1,52 .060 | 0,76 .030 |
| V7-1X2AD8-022 | 6 Amps X (350°F) | 185 6.5 | 15 .53 | 1,40 .055 | 0,76 .030 | 0,38 .015 |
| V7-1B17D8-022 | 11 Amps B | 82 2.9 | 8 .28 | 3,04 .120 | 1,7 .067 | 0,68 .027 |
| V7-1C17E9-022 | 15.1 Amps C | 82 2.9 | 8 .28 | 3,04 .120 | 1,7 .067 | 0,76 .030 |
| V7-1V19E9-022 | 21 Amps V | 95 3.3 | 5 .18 | 3,3 .130 | 1,78 .070 | 0,76 .030 |

2.34" LEVER TIMESAVER SERIES

| | | | | | | |
|---------------|------------------------|-----------|------------|--------------|--------------|--------------|
| V7-3S17D8-048 | 1 Amp S | 16 .56 | .5 .018 | 5,97 .235 | 3,0 .118 | 1,27 .050 |
| V7-2B17D8-048 | 11 Amps B | 20 .7 | 1 .035 | 5,97 .235 | 2,92 .115 | 1,27 .050 |
| V7-1C17E9-048 | 15.1 Amps C | 85 3 | 4 .14 | 5,97 .235 | 1,65 .065 | 1,29 .051 |
| V7-9W1AE9-048 | 15.1 Amps W (350°F) | 90 3.2 | 4 .14 | 6,35 .250 | 3,15 .124 | 1,37 .054 |

* For SPST (N.O. & N.C.) circuitry, contact the 800 number.

NOTE: Catalog listings in V7 Order Guides have standard .114" mounting holes. For 3mm size holes, contact the 800 number.

SIMULATED ROLLER LEVERS

ORDER GUIDE - SPDT* 1.29" LEVER TIMESAVER SERIES

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel.



Dim. Dwg. Fig. 3

1.29" LEVER TIMESAVER SERIES

| Catalog Listing | Elect. Rating P. 38 | O.F. max. grams ounces | R.F. min. grams ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches |
|-----------------|------------------------|------------------------------|------------------------------|---------------------------|---------------------------|---------------------------|
| V7-1S17D8-263 | 1 Amp S | 90 3.15 | 9 .32 | 2,79 .110 | 1,9 .075 | 0,76 .030 |
| V7-1B17D8-263 | 11 Amps B | 90 3.15 | 9 .32 | 2,79 .110 | 1,52 .060 | 0,76 .030 |
| V7-1C17D8-263 | 15.1 Amps C | 91 3.19 | 9 .32 | 2,79 .110 | 1,54 .061 | 0,61 .024 |

.81" ROLLER LEVER TIMERSAVER SERIES

| | | | | | | |
|---------------|----------------|-------------|-----------|--------------|--------------|--------------|
| V7-2S17D8-201 | 1 Amp S | 90 3.15 | 7 .25 | 1,19 .047 | 1,02 .040 | 0,38 .015 |
| V7-2B17D8-201 | 11 Amps B | 88 3.1 | 7 .25 | 1,3 .052 | 1,04 .041 | 0,3 .012 |
| V7-1C17E9-201 | 15.1 Amps C | 176 6.16 | 19 .67 | 1,3 .052 | 0,81 .032 | 0,3 .012 |
| V7-1V19E9-201 | 21 Amps V | 205 7.2 | 15 .5 | 1,42 .056 | 0,81 .032 | 0,33 .013 |



Dim. Dwg. Fig. 4

1.34" ROLLER LEVER TIMERSAVER SERIES

| | | | | | | |
|---------------|----------------|------------|-----------|--------------|--------------|--------------|
| V7-3S17D8-207 | 1 Amp S | 35 1.23 | 2 .07 | 2,79 .110 | 2,03 .080 | 0,76 .030 |
| V7-2A17D8-207 | 5 Amps A | 43 1.51 | 3 .105 | 2,92 .115 | 1,52 .060 | 0,64 .025 |
| V7-1C17E9-207 | 15.1 Amps C | 86 3 | 9 .32 | 2,84 .112 | 1,63 .064 | 0,64 .025 |
| V7-1V19E9-207 | 21 Amps V | 100 3.5 | 7 .25 | 3,07 .121 | 1,65 .065 | 0,76 .030 |



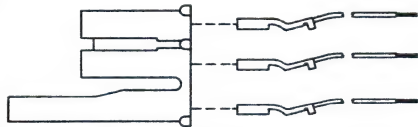
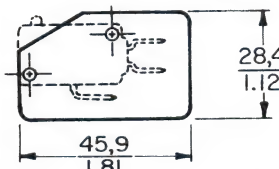

Dim. Dwg. Fig. 7

* For SPST (N.O. & N.C.) circuitry, contact the 800 number.

NOTE: Catalog listing in V7 Order Guides have standard .114" mounting holes. For 3mm size holes, contact the 800 number.

ORDER GUIDE – ACCESSORIES

Key: 0,0 = mm
0.00 = inches

| Catalog Listing | Description | Catalog Listing | Description |
|-----------------|---|-----------------|---|
| 15PA176-V7 | Connector/Receptacle packet - Includes 25 connectors and 75 receptacles with 18", blue 16 gauge PVC insulated, stranded wire. (To be used with D8 terminals only).  | 15PA177-V7 | Insulator packet (500 pcs.) .018" thick varnished fiberglass.  |
| 15PA260 | Plunger boot seal. Elastomer dust and splash resistant plunger seal.  | | |

Dimensions shown are for reference only.

INTERNATIONAL SERIES

PIN PLUNGER



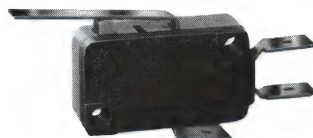
Dim. Dwg. Fig. 1

ORDER GUIDE - SPDT* INTERNATIONAL SERIES

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel.

| Catalog Listing | Elect. Rating P. 38 | O.F. max. grams ounces | R.F. min. grams ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches |
|-----------------|------------------------|------------------------------|------------------------------|---------------------------|---------------------------|------------------------|
| V7-1B11E9 | 11 Amps B | 150 5.3 | 25 .88 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-2B11D8 | 11 Amps B | 75 2.63 | 10 .35 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-2B11PO2 | 11 Amps B | 75 2.63 | 10 .35 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-3E11D8 | 10 Amps E | 50 1.75 | 5 .175 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |
| V7-3E11E9 | 10 Amps E | 50 1.75 | 5 .175 | 1,19 .047 | 1,27 .050 | 0,05-0,25 .002-.010 |

STRAIGHT LEVERS



Dim. Dwg. Fig. 5

1.40" LEVER INTERNATIONAL SERIES

| | | | | | | |
|---------------|--------------|------------|-----------|--------------|--------------|--------------|
| V7-1B11E9-022 | 11 Amps B | 80 2.8 | 8 .28 | 2,79 .110 | 2,28 .090 | 0,76 .030 |
| V7-2B11E9-022 | 11 Amps B | 45 1.58 | 4 .14 | 2,79 .110 | 2,28 .090 | 0,76 .030 |
| V7-3E11D8-022 | 10 Amps E | 30 1.05 | 2 .070 | 2,79 .110 | 2,28 .090 | 0,76 .030 |

SIMULATED ROLLER LEVERS

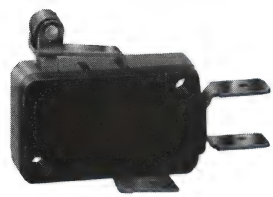


Dim. Dwg. Fig. 3

1.29" LEVER INTERNATIONAL SERIES

| | | | | | | |
|---------------|--------------|------------|-----------|--------------|-------------|--------------|
| V7-2B11D8-263 | 11 Amps B | 50 1.75 | 5 .175 | 2,54 .100 | 1,9 .075 | 0,76 .030 |
| V7-3E11E9-263 | 10 Amps E | 33 1.16 | 2 .070 | 2,54 .100 | 1,9 .075 | 0,76 .030 |

ROLLER LEVERS



Dim. Dwg. Fig. 4

ORDER GUIDE - SPDT* .81" LEVER INTERNATIONAL SERIES

| | | | | | | |
|---------------|--------------|------------|-----------|--------------|--------------|--------------|
| V7-2B11D8-201 | 11 Amps B | 90 3.15 | 10 .35 | 1,19 .047 | 1,02 .040 | 0,38 .015 |
| V7-3E11D8-201 | 10 Amps E | 62 2.17 | 5 .175 | 1,19 .047 | 1,02 .040 | 0,38 .015 |

1.34" LEVER INTERNATIONAL SERIES

| | | | | | | |
|---------------|--------------|------------|-----------|--------------|--------------|--------------|
| V7-2B11E9-207 | 11 Amps B | 45 1.58 | 5 .175 | 2,54 .100 | 2,16 .085 | 0,76 .030 |
|---------------|--------------|------------|-----------|--------------|--------------|--------------|

NOTE: Catalog listings in V7 Order Guides have standard .114" mounting holes. For 3mm size holes, contact the 800 number.



Dim. Dwg. Fig. 7

Basic Switches

Miniature

V7 Series

MOUNTING DIMENSIONS (for reference only)

Key: 0,0 = mm
0.00 = inches

PIN PLUNGER

Fig. 1

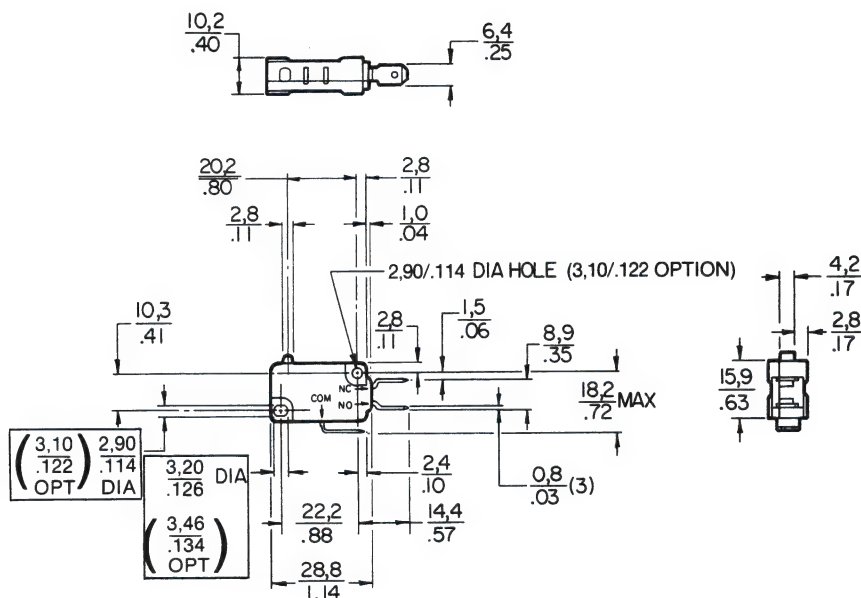


Fig. 2 Straight Lever (Style-002)

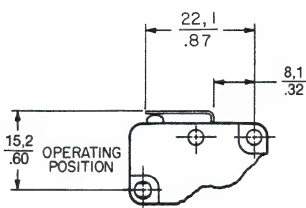


Fig. 3 Simulated Roller (Style-263)

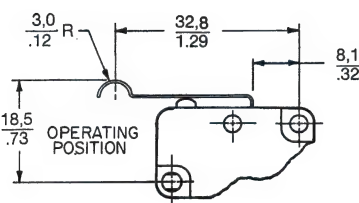


Fig. 4 Roller Lever (Style-201)

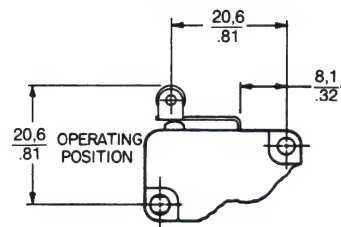


Fig. 5 Straight Lever (Style-022)

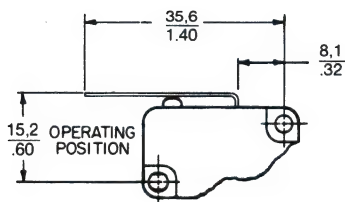


Fig. 6 Straight Lever (Style-048)

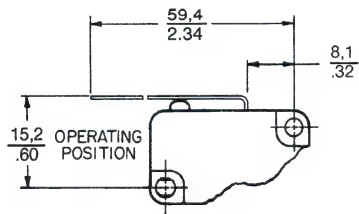
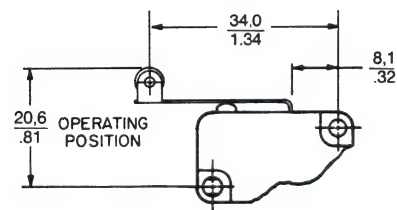


Fig. 7 Roller Lever (Style-207)



NOTE: All levers are 0.17" (4,31 mm) wide. Rollers are 0.19" (4,82 mm) wide.

NOTE: Operate point dimensions taken at top of lever/roller.

Basic Switches

Miniature Double-break

TB Series



FEATURES

- Power load switching capability up to 10 amperes
- Motor handling capacity of ½ horsepower, 125 VAC
- Two- and four-circuit double-break
- Several auxiliary actuators
- Choice of terminal styles
- UL recognized, CSA certified
- Momentary action

GENERAL INFORMATION

TB miniature switches are basic double-break units which offer a means of controlling isolated circuits. Each circuit can be driven by independent voltage sources. These switches find many uses in modern control systems because of their circuitry.

The terminals of two- and four-circuit double break switches must be wired to identical voltage sources and the same polarity so that a voltage potential is not set up between adjacent terminals. A voltage potential between adjacent terminals could promote dielectric breakdown at high energy levels. The loads should be on the same sides of the line.

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

ORDER GUIDE



Dim. Dwg. Fig. 1

| Catalog Listing | Description | Electrical Data And UL Code Page 20 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.** mm inches |
|-----------------|---|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|-------------------------------|---------------------|
| 1TB1-1 | Two-circuit, double-break end screw terminals | 10 Amps Z | 1,95-3,61 7-13 | 1,11 4 | 1,52 .060 | 0,25 .010 | 0,25-0,64 .010-.025 | 11,7 .460 |



Dim. Dwg. Fig. 2

| | | | | | | | | |
|--------|--|---------------------|--------------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|
| 1TB1-2 | Two-circuit, double-break end solder terminals | 10 Amps Z | 1,95-3,61 7-13 | 1,11 4 | 1,52 .060 | 0,25 .010 | 0,25-0,64 .010-.025 | 11,7 .460 |
|--------|--|---------------------|--------------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|



Dim. Dwg. Fig. 3

| | | | | | | | | |
|--------|--|---------------------|--------------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|
| 1TB1-3 | Two-circuit, double-break front solder terminals | 10 Amps Z | 1,95-3,61 7-13 | 1,11 4 | 1,52 .060 | 0,25 .010 | 0,25-0,64 .010-.025 | 11,7 .460 |
|--------|--|---------------------|--------------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|



Dim. Dwg. Fig. 4

| | | | | | | | | |
|---------|---|---------------------|---------------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|
| 41TB5-3 | Four-circuit, double-break front solder terminals | 10 Amps Z | 5,56-10,0 20-36 | 2,22 8 | 1,78 .070 | 0,25 .010 | 0,64-1,14 .025-.045 | 4,70 .185 |
|---------|---|---------------------|---------------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|

* ±0,38 mm
±.015 in

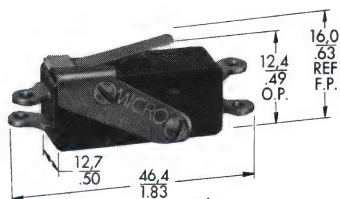
Basic Switches

Miniature Double-break

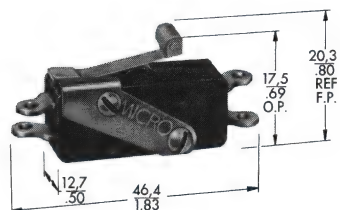
TB Series

AUXILIARY ACTUATORS

For use with 1TB1-1 and 1TB1-2 switches



JT-1



JT-5

Switches are not included with the actuators.

MOUNTING DIMENSIONS (For reference only)

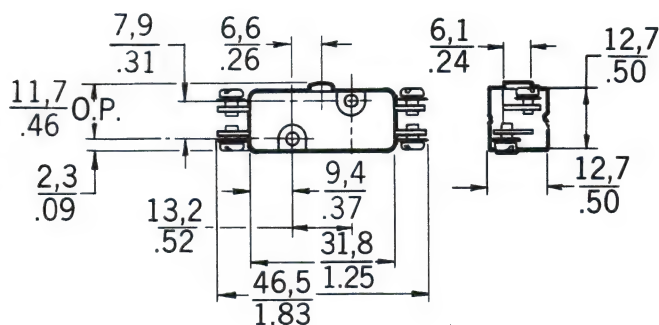


Fig. 1

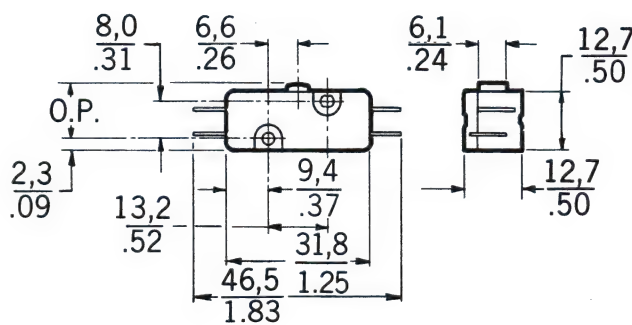


Fig. 2

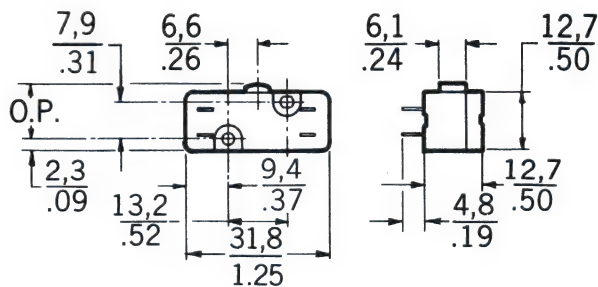


Fig. 3

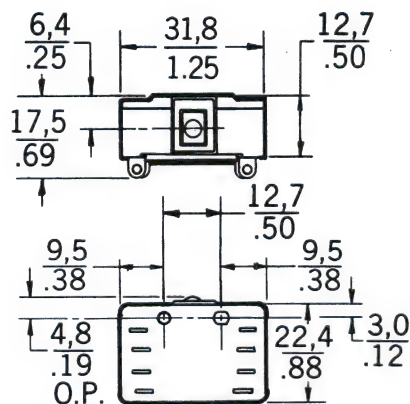


Fig. 4

Key: 0,0 = mm
0.00 = inches

ORDER GUIDE

| Catalog Listing | Description |
|-----------------|----------------------|
| JT-1 | Leaf actuator |
| JT-5 | Roller leaf actuator |

Miniature/
Subminiature

Basic Switches

Standard

ELECTRICAL DATA AND UL CODES STANDARD BASIC SWITCHES

Most of the switches in this section are UL recognized and CSA certified. The current and voltage values shown are based on test conditions specified by these agencies. Electrical life of the switch is influenced by each application condition as well as by voltage and current. For application assistance contact the 800 number.

| Circuitry | Electrical Data and UL Codes |
|--|---|
| Single-pole double-throw unless otherwise noted in order guide | A 15 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L96 |
| Single-pole double-throw unless otherwise noted in order guide | B 5 amps, 125, 250 or 480 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L35 |
| Single-pole double-throw unless otherwise noted in order guide | C 10 amps, 125, 250 or 480 vac; UL Code L8 |
| Single-pole double-throw unless otherwise noted in order guide | D 15 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac. UL Code L103 |
| Single-pole double-throw unless otherwise noted in order guide | E 15 amps, 125, 250 or 480 vac; 1/4 hp, 125 vac; 1/2 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L67 |
| Single-pole double-throw unless otherwise noted in order guide | F 22 amps, 125, 250 or 480 vac; 1/2 hp, 125 vac, 1 hp, 250 vac. UL Code L161 |
| Single-pole double-throw unless otherwise noted in order guide | G 20 amps, 125, 250 or 480 vac; 10 amps, 125 vac "L" (tungsten lamp load); 1 hp, 125 vac; 2 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L23 |
| Single-pole double-throw unless otherwise noted in order guide | H Motor Control 25 amps, 125, 250 or 480 vac; 1 hp, 125 vac; 2 hp, 250 vac; Pilot Duty—750 VA, 125, 250, or 277 vac. |
| Single-pole double-throw unless otherwise noted in order guide | I 10 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; UL Code L95 |

| Circuitry | Electrical Data and UL Codes |
|---|--|
| Double-pole double-throw | J 10 amps, 125 or 250 vac; 0.3 amp, 125 vdc; 0.15 amp, 250 vdc. UL Code L59 |
| Single-pole double-throw unless otherwise noted in order guide | K Rating established with switch non-polarized 10 amps, 125 vac or vdc; 1/4 hp, 125 vac or vdc. UL Code L 168 Non-polarized: 10 amps res. or 1/4 hp, 125 vdc; 3 amps max. res. 250 vdc. Polarized*: 10 amps res. or 1/2 hp, 125 vdc; 3 amps max. res., 250 vdc. |
| *To polarize, connect negative side of line to common terminal. To achieve the same effect, mount switch with brass screws, using a non-magnetic barrier (at least 1/4" thick) between the switch and mounting surface. | |
| Two-circuit double-break | M 25 amps, 125, 250 or 480 vac; 1/4 hp, 125 vac; 1 1/4 amp, 250 vac. 1 amp, 125 vdc; 1/2 amp, 250 vdc. UL Code L58 |
| Single-pole double-throw | P 1 amp, 125 VAC UL Code L22 |
| Single-pole double-throw | R 10 amps, 125 or 250 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L115 |
| Single-pole double-throw | S 10 amps, 125 or 250 vac; 1/8 hp, 125 or 250 vac. UL Code L93 |
| Two-circuit double-break | T 15 amps, 125, 250 or 480 vac; 1 amp, 125 vdc; 1/2 amp, 250 vdc; 1/4 hp, 125 vac; 1/2 hp, 250 vac UL Code L73 |
| Single-pole double-throw | U 5 amps, 250 vac. UL Code L4 |
| Two-circuit double-break | V Motor Control 15 amps, 120, 240, 480 or 600 vac; 1/2 hp, 120 vac; 1 hp, 240 vac; 0.8 amp, 115 vdc; 0.4 amp, 230 vdc. |
| Single-pole single-throw (N.C.) | W 20 amps, 125, 250 or 277 vac; 1/4 hp, 125 vac; 1/2 hp, 250 vac UL Code L178B |
| Single-pole double-throw | X 15 amps, 125, 250 or 480 vac; 2 amps, 600 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L74 |
| Single-pole double-throw | Y 20 amps, 125, 250 or 480 vac; 1/4 hp, 125 vac; 1 1/2 hp, 250 vac; UL Code L17 |

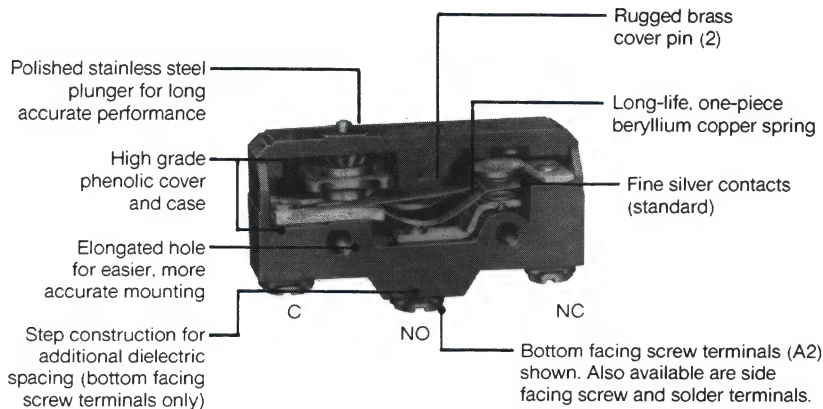
Basic Switches

Standard

BZ/BA Series

STANDARD BASIC SWITCH CUT-A-WAY

The cut-a-way shown is representative of the standard basic switches described in this catalog.



GENERAL INFORMATION

MICRO SWITCH standard basic switches are precision snap-action mechanisms enclosed in accurately molded plastic cases. These switches are carefully manufactured and thoroughly inspected. They are industry known for their compactness, light weight, accurate repeatability and long life.

MOUNTING DIMENSIONS

Mounting dimensions are included at the end of each product section. They are shown in English and metric equivalents. These dimensions are for reference only. For exacting layout work, request an engineering layout work, request an engineering drawing from the 800 number.

Mounting holes for Types BZ, BM, BA, BE, DT, MT, and 6AS switches accept pins or screws of .139 inch (3,53 mm) diameter.

RECOMMENDED TORQUE (max.)

Mounting screws 3 in./lbs.*
Terminal screws 4 in./lbs.
Panel mount bushing 4-6 in./lbs.

*Note: Tightening mounting screws above 3 in./lbs. changes operating characteristics and increases the possibility of cracking the case.

UL/CSA

Our basic switches are Component Recognized by Underwriters' Laboratories, Inc. and certified by Canadian Standards Association. The BA, BZ, and BM line is covered as Special Use Switches to UL Standard 1054; the BE line is covered as an Industrial Motor Controller to UL Standard 508.

Agency File References are:

| | |
|----------|---------------------------------|
| BA | UL File E12252, issued 12-09-88 |
| BM | UL File E12252, issued 12-08-88 |
| BZ | UL File E12252, issued 6-29-89 |
| BE-1,2,5 | UL File E22779, Vol. 4, Sec. 1 |
| BE-R | UL File E22779, Vol. 4, Sec. 2 |

FEATURES

- Operating force as low as 4 oz. (113 grams) maximum
- Sensitive differential travel as low as .0002 to .0003 inches (0,005 to 0,008 mm)
- Power load switching capability to 25 amperes
- Motor handling capacity to 2 horsepower at 250 VAC
- Long mechanical life
- High temperature constructions for up to +400°F (204°C)
- Momentary or maintained contact action
- Alloy contacts available for special application needs
- Variety of integral actuators
- Variety of auxiliary actuators
- Variety of terminal designs
- Optional sealed plunger and cover
- Stainless steel snap spring available
- Military standard construction available with over 50 listings on the MIL-S-8805 Qualified products list
- UL recognized, CSA certified

Characteristics as stated are taken at normal room temperature and humidity. These may vary as temperature and humidity conditions differ.

The type BZ switch design meets most applications needs. Modifications of the standard silver contact design and material, spring configuration, and plunger locations give the type BM, BA and BE switches greater electrical load handling capacity. Other changes in materials and switch design provide operating characteristics, temperature tolerances, and sealing to cover a wide range of special requirements.

GENERAL SWITCH IDENTIFICATION

First letter in catalog listing designates:

B = Single-pole double-throw
W = Single-pole single-throw (normally closed)
Y = Single-pole single-throw (normally open)

Second letter in catalog listing designates:

Z = Standard 15-amp version
M = 22-amp version
A = Standard 20-amp version
E = 25-amp version

This section covers only **over 100** of our most popular BZ/BA type Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **1800** other active listings will meet your needs. Contact the 800 number.

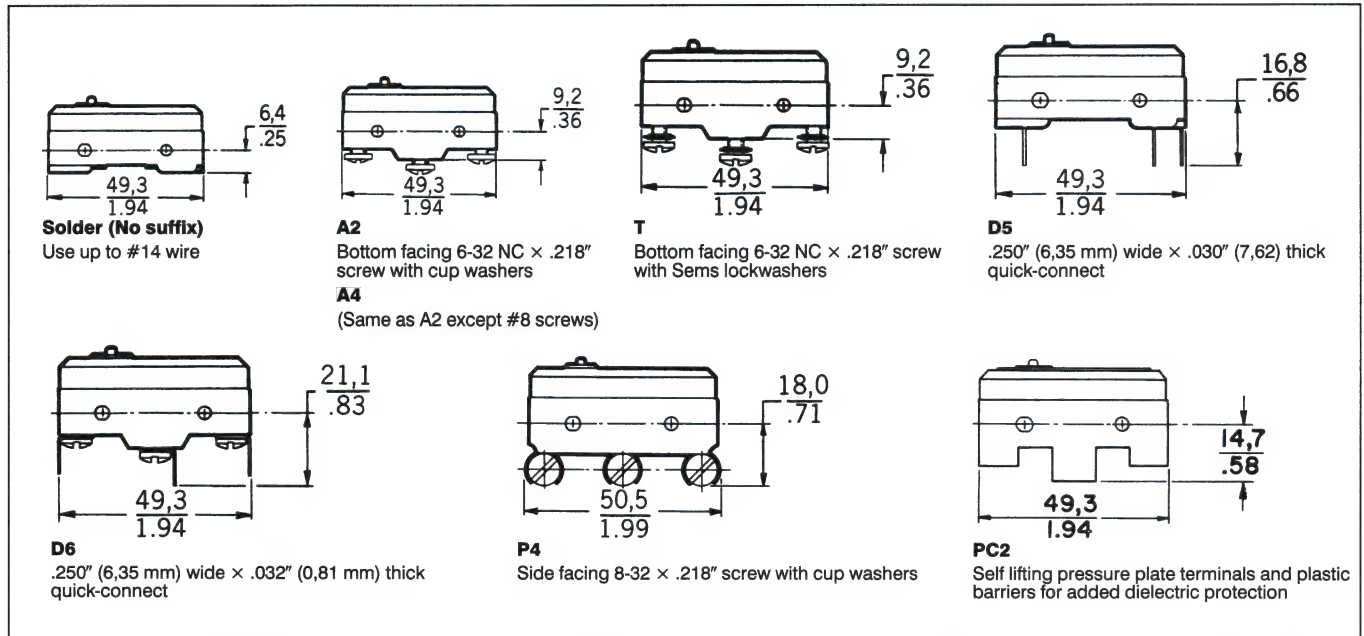
Basic Switches

Standard

BZ/BA Series

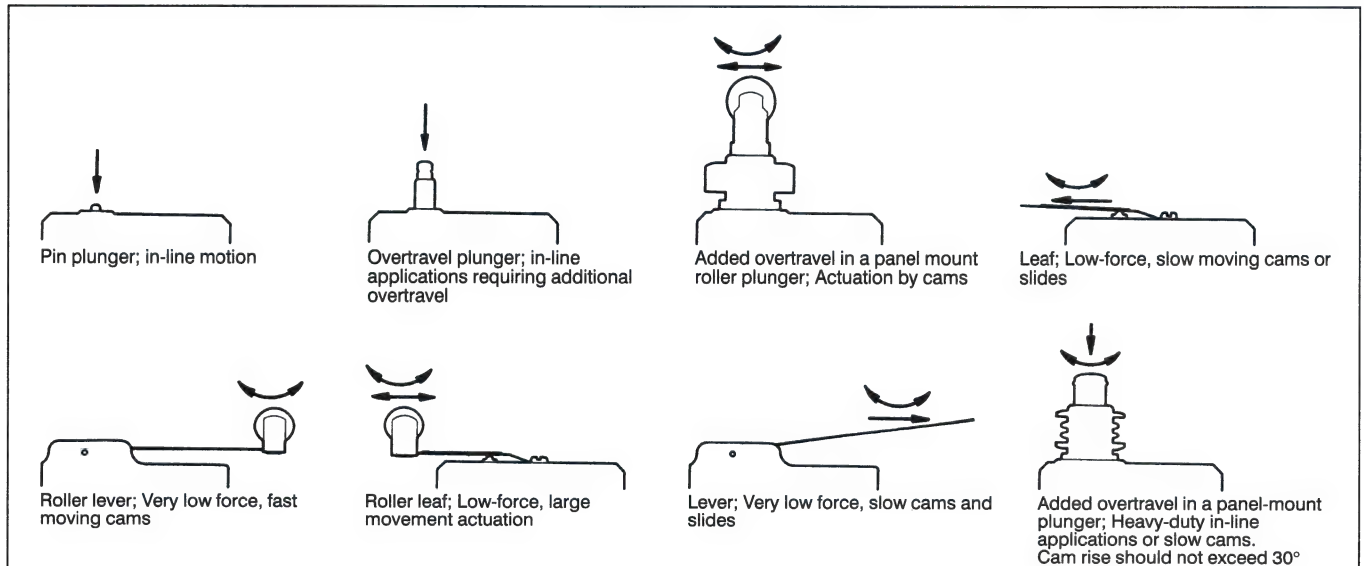
AVAILABLE TERMINALS

Most of the BZ/BA catalog listings have A2 type terminals. Several other terminal styles are shown and others are available. Specific information should be requested from the 800 number or local Authorized Distributor.



ACTUATORS

BA, BE, BM and BZ standard basic switches use the actuators described.



Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

ORDER GUIDE by ascending electrical capability

PIN PLUNGER

BZ/BA TYPE



Dim. Dwg. Fig. 1

SEALED TYPE



Dim. Dwg. Fig. 2

BA/BE TYPE



Dim. Dwg. Fig. 3



Dim. Dwg. Fig. 4

| Catalog Listing | Recommended For | Electrical Data And UL Codes Page 46 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.** mm inches |
|------------------------------|---|--------------------------------------|---------------------------|--------------------------|---------------------|------------------------------|-----------------------------------|----------------------|
| BZ-2R72-A2 | Applications requiring gold alloy contacts | 1 Amp P | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| BZ-2R72551-A2 | Gold alloy contacts Dustproof and splash resistant seal | 1 Amp P | 2,22-4,17 8-15 | 1,11 4 | — — | 0,13 .005 | 0,01-0,06 .0004-.0025 | 15,88 .625 |
| BZ-2R244-A2 | Operating in temp. to +400°F (204°C) for 100 hours | 5 Amps B | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| BZ-R21-A2 | Lower force | 10 Amps C | 1,11 4 | 0,7 2.5 | 0,30 .012 | 0,13 .005 | 0,005-0,013 .0002-.0005 | 15,88 .625 |
| BZ-2R-A2 | Most applications SPDT | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| WZ-2R-A2 | SPST (normally closed) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| YZ-2R-A2 | SPST (normally open) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| BZ-R-A2 | Less differential travel | 15 Amps D | 1,95-2,5 7-9 | 1,11 4 | 0,30 .012 | 0,13 .005 | 0,005-0,008 .0002-.0003 | 15,88 .625 |
| BZ-R19-A2 | Best repeatability | 15 Amps D | 1,95-3,34 7-12 | 1,11 4 | 0,30 .012 | 0,13-0,2 .005-.008 | 0,005-0,02 .0002-.0008 | 16,26 .640 |
| BZ-2R24-A2 | Operating in temp. to +250°F (121°C) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| BZ-2RT04 (8805/1-004) | MIL-S-8805 application requirements | 15 Amps A | 2,5-3,61 9-13 | 1,67 6 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| BZ-2R05-A2 | Best stability under varying humidity | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,01-0,05 .0004-.0020 | 15,88 .625 |
| BZ-2R5551-A2 | Dustproof and splash resistant seal | 15 Amp A | 2,5-4,17 9-15 | 1,11 4 | — — | 0,13 .005 | 0,01-0,06 .0004-.0025 | 15,88 .625 |
| BZ-2R55-A2-S | Best service for sealed construction. Stainless steel internal snap spring. | 15 Amps A | 2,5-4,17 9-15 | 1,11 4 | — — | 0,13 .005 | 0,01-0,06 .0004-.0025 | 15,88 .625 |
| BA-2R-A2 | Up to 20 ampere load handling | 20 Amps G | 3,89-6,12 14-22 | 2,78 10 | 1,27 .050 | 0,25 .010 | 0,05-0,19 .0020-.0075 | 16,26 .640 |
| BA-2R24-A2 | Operating in temperature to +250°F (121°C) | 20 Amps G | 3,89-6,12 14-22 | 2,78 10 | 1,27 .050 | 0,25 .010 | 0,05-0,19 .0020-.0075 | 16,26 .640 |
| BM-1R-A2 | Up to 22 ampere load handling | 22 Amps F | 1,95-2,78 7-10 | 1,11 4 | 0,38 .015 | 0,13 .005 | 0,013-0,025 .0005-.0010 | 15,88 .625 |
| BE-2R-A4 | Up to 25 ampere load handling | 25 Amps H | 3,89-6,12 14-22 | 2,78 10 | 1,27 .050 | 0,25 .010 | 0,05-0,19 .0020-.0075 | 16,26 .640 |

| | | | | | | | | |
|------------------|--|---------------------|---|-------------|--------------------------|---|--------------------------|---|
| BZ-RX | Manual reset (maintained contact) applications, solder terminals | 15 Amps E | 1,95-2,5 7-9 0,56-2,78* 2-10 | — — — | 0,30 .012 — | 0,13 .005 0,38* .015 | — — — | 15,88 .625 |
| WA-1RX-A4 | Manual reset SPST-NC, A4 terminals | 20 Amps W | 5,56 20 6,95* 25 | — — — | — — — | 0,25 .010 — | 0,20 .008 — | 16,26 .64 27,9* 1.10 |

*Reset characteristics.

Except where stated ** ±0,38mm ±.015 in.

All catalog listings shown are not necessarily stock items. Stocking depends on sales experience.

Auxiliary actuators see p. 62-63.

Characteristics: O.F. — Operating Force;
R.F. — Release Force; P.T. — Pretravel;
O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position.

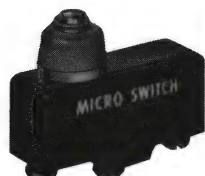
OVERTRAVEL PLUNGER

ORDER GUIDE



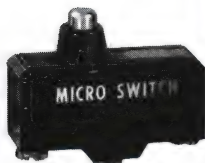
Dim. Dwg. Fig. 11

| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.* mm inches |
|--------------------|--|---|---------------------------|--------------------------------|---------------------------|---------------------------|--|-----------------------|
| BZ-2RD72-A2 | Applications requiring gold alloy contacts | 1 Amp P | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,01-0,05 .0004- .0020 | 21,21 .835 |
| BZ-2RD-A2 | Added overtravel. For manual operation and slow 20° (max) cam rise | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,01-0,05 .0004- .0020 | 21,21 .835 |
| BZ-2RD24-A2 | Operating in temperature to +250°F (121°C) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,01-0,05 .0004- .0020 | 21,21 .835 |
| BM-1RD-A2 | Up to 22 ampere load handling | 22 Amps F | 1,95-2,78 7-10 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,013-0,025 .0005- .0010 | 21,21 .835 |



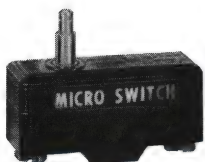
Dim. Dwg. Fig. 12

| | | | | | | | | |
|-------------------------|---|---------------------|---------------------------|------------------|---|---------------------|---------------------------------------|-----------------------|
| BZ-2RDS725551-A2 | Applications requiring gold alloy contacts plus dustproof and splash resistant seal | 1 Amp P | 3,61-5,28 13-19 | 1,11 4 | — | 1,52 .060 | 0,01-0,063 .0004- .0025 | 28,20 1.110 |
| BZ-2RDS5551-A2 | Dustproof and splash resistant seal | 15 Amps A | 3,61-5,28 13-19 | 1,11 4 | — | 1,52 .060 | 0,01-0,063 .0004- .0025 | 28,20 1.110 |



Dim. Dwg. Fig. 13

| | | | | | | | | |
|------------------|-------------------------------|---------------------|---------------------------|-------------------|---------------------|---------------------|--------------------------------------|----------------------|
| BA-2RB-A2 | Up to 20 ampere load handling | 20 Amps G | 3,89-6,12 14-22 | 2,78 10 | 1,27 .050 | 2,39 .094 | 0,05-0,19 .0020- .0075 | 26,20 1.03 |
| BE-2RB-A4 | Up to 25 ampere load handling | 25 Amps H | 3,89-6,12 14-22 | 2,78 10 | 1,27 .050 | 2,39 .094 | 0,05-0,19 .0020- .0075 | 26,20 1.03 |



Dim. Dwg. Fig. 14

| | | | | | | | | |
|-------------------------------|---|---------------------|--------------------------|------------------|---------------------|---------------------|--|-----------------------|
| BZ-2RS72-A2 | Applications requiring gold alloy contacts | 1 Amp P | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,01-0,05 .0004- .0020 | 28,20 1.110 |
| BZ-2RS-A2 | Added overtravel. For in-line operation and with JR auxiliary actuators | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,01-0,063 .0004- .0025 | 28,20 1.110 |
| BZ-2RS24-A2 | Operating in temperature to +250°F (121°C) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,01-0,05 .0004- .0020 | 28,20 1.110 |
| BZ-2RST04 M8805/1-012) | MIL-S-8805 application requirements | 15 Amps A | 2,5-3,61 9-13 | 1,67 6 | 0,38 .015 | 1,52 .060 | 0,01-0,05 .0004- .0020 | 28,20 1.110 |
| BZ-RSX | Manual reset solder terminals | 15 Amps E | 1,95-2,64 7-9 | — — | 0,30 .012 | 0,64 .025 | — — | 2,79 1.11 |
| BM-1RS-A2 | Up to 22 ampere load handling | 22 Amps F | 1,95-2,78 7-10 | 1,11 4 | 0,38 .015 | 1,52 .060 | 0,013-0,025 .0005- .0010 | 28,20 1.110 |



Dim. Dwg. Fig. 15

| | | | | | | | | |
|-------------------------|---|---------------------|-------------------------|------------------|---|---------------------|---------------------------------------|-----------------------|
| BZ-2RS7225551-A2 | Applications requiring gold alloy contacts plus dustproof and splash resistant seal | 1 Amp P | 2,5-4,17 9-15 | 1,11 4 | — | 1,52 .060 | 0,01-0,063 .0004- .0025 | 28,20 1.110 |
| BZ-2RS5551-A2 | Dustproof and splash resistant seal | 15 Amps A | 2,5-4,17 9-15 | 1,11 4 | — | 1,52 .060 | 0,01-0,063 .0004- .0025 | 28,20 1.110 |

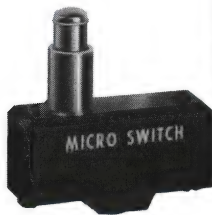
*±0,51 mm
±.020 in.

Basic Switches

Standard

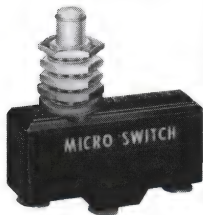
BZ/BA Series

OVERTRAVEL PLUNGER



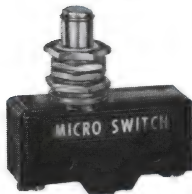
Dim. Dwg. Fig. 16

BZ/BM TYPE

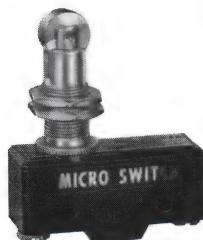


Dim. Dwg. Fig. 17

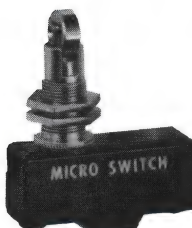
BA TYPE



Dim. Dwg. Fig. 18



Dim. Dwg. Fig. 19



Dim. Dwg. Fig. 20

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.** mm inches |
|--------------------|---|--------------------------------------|----------------------|--------------------------|---------------------|---------------------|------------------------------|------------------------------|
| BZ-2RQ-A2 | Added overtravel. For manual in-line operation and for slow 30° (max) rise cams | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 5,56 .219 | 0,01-0,05 .0004-.0020 | 38,10±0,51 1.500±.020 |
| BZ-2RQ24-A2 | Operating in temperature to ±250°F (121°C) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 5,56 .219 | 0,01-0,05 .0004-.0020 | 38,10±0,51 1.500±.020 |

| | | | | | | | | |
|--------------------------------|--|------------------|------------------------|----------------|------------------|------------------|--------------------------------|---|
| BZ-2RQ172-A2 | Applications requiring gold alloy contacts | 1 Amp P | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 5,56 .219 | 0,01-0,05 .0004-.0020 | 21,82 .859 |
| BZ-2RQ1-A2 | BZ-2RQ-A2 type applications with panel mount | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 5,56 .219 | 0,01-0,05 .0004-.0020 | 21,82 .859 |
| BZ-2RQ1T04 M8805/1-020) | MIL-S-8805 application requirements | 15 Amps A | 2,5-3,61 9-13 | 1,67 6 | 0,38 .015 | 5,56 .219 | 0,01-0,05 .0004-.0020 | 21,82 .859 |
| BZ-2RQ124-A2 | Operating in temperature to ±250°F (121°C) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 5,56 .219 | 0,01-0,05 .0004-.0020 | 21,82 .859 |
| BZ-2RN702 | Furnished with unassembled seal boot. | 15 Amps X | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 3,18 .125 | 0,01-0,05 .0004-.0020 | 48,4±0,50 1.906±.020 |
| BZ-RQ1X | Manual reset. Solder terminals | 15 Amps E | 1,67-2,64 6-9.5 | – | 0,30 .012 | 5,56 .219 | – | 23,42±1,14 .922±.045 7,14* .281* |
| BA-2RQ1-A2 | Up to 20 ampere load handling | 20 Amps G | 3,89-6,12 14-22 | 2,78 10 | 1,27 .050 | 5,56 .219 | 0,05-0,19 .0020-.0075 | 21,82 .859 |
| BM-1RQ1-A2 | Up to 22 ampere load handling | 22 Amps F | 1,95-2,78 7-10 | 1,11 4 | 0,38 .015 | 5,56 .219 | 0,013-0,025 .0005-.0010 | 21,82 .859 |

| | | | | | | | | |
|----------------------|--|------------------|------------------------|---------------|------------------|------------------|--------------------------------|------------------------------|
| BZ-2RQ1872-A2 | Applications requiring gold alloy contacts | 1 Amp P | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 3,56 .140 | 0,01-0,05 .0004-.0020 | 33,32±1,14 1.312±.045 |
| BZ-2RQ18-A2 | Added overtravel. Roller plunger for rapid cam (30° max) rise and slide operation. Panel mount | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 3,56 .140 | 0,01-0,05 .0004-.0020 | 33,32±1,14 1.312±.045 |
| BZ-2RQ1824-A2 | Operating in temperature to ±250°F (121°C) | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 3,56 .140 | 0,01-0,05 .0004-.0020 | 33,32±1,14 1.312±.045 |
| BZ-2AQ18T1 | Double-break circuitry | 15 Amps T | 3,89-6,68 14-24 | 1,11 4 | 0,51 .020 | 3,58 .141 | 0,03-0,10 .001-.004 | 33,35±1,19 1.313±.047 |
| BM-1RQ18-A2 | Up to 22 ampere load handling | 22 Amps F | 1,95-2,78 7-10 | 1,11 4 | 0,38 .015 | 3,56 .140 | 0,013-0,025 .0005-.0010 | 33,32±1,14 1.312±.045 |

| | | | | | | | | |
|---------------------|---|------------------|----------------------|---------------|------------------|------------------|------------------------------|------------------------------|
| BZ-2RQ181-A2 | Applications requiring roller plunger 90° to major axis of switch | 15 Amps A | 2,5-3,61 9-13 | 1,11 4 | 0,38 .015 | 3,56 .140 | 0,01-0,05 .0004-.0020 | 33,32±1,14 1.312±.045 |
|---------------------|---|------------------|----------------------|---------------|------------------|------------------|------------------------------|------------------------------|

* Reset characteristics.

Except where stated ** ±0,76 mm ±.030 in.

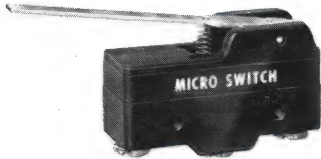
Standard
Basic Switches

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position.

STRAIGHT LEVER

ORDER GUIDE

BZ/BM TYPE



Dim. Dwg. Fig. 21

BA TYPE

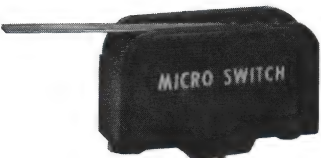


Dim. Dwg. Fig. 23

ADJUSTABLE



Dim. Dwg. Fig. 22



Dim. Dwg. Fig. 24

| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.** mm inches |
|-------------------------------|--|--------------------------------------|----------------------------|--------------------------|----------------------|---|-------------------------------|--|
| BZ-2RW8072-A2 | Applications requiring gold alloy contacts | 1 Amp P | 0,7 2.5 | 0,14 0.5 | — | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-2RW8072255105-A2 | Best stability under varying humidity. Gold alloy contacts with seal | 1 Amp P | 0,7 2.5 | 0,14 0.5 | — | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-2RW8244-A2 | Operating in temp. to +400°F (204°C) for 100 hours | 5 Amps B | 0,7 2.5 | 0,14 0.5 | — | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-RW8435-A2 | Lowest operating force (without external return spring) | 10 Amps I | 0,07 .25 | — | 6,76 .266 | 5,56 .219 | 0,08-0,38 .003-.015 | 19,1 .750 |
| BZ-2RW876T | 1.25 inch lever requirements | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 0,42 .141 | 0,10-0,63 .004-.025 | 19,1 .750 |
| BZ-2RW80-A2 | 2.5 inch lever requirements | 15 Amps A | 0,7 2.5 | 0,14 0.5 | — | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-2RW84-A2 | Lower force (without external return spring) | 15 Amps A | 0,28 1 | 0,03 0.125 | 8,33 .328 | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-2RW80551-A2 | Dustproof and splash resistant seal | 15 Amps A | 0,7 2.5 | 0,14 0.5 | — | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-2RWT04 M8805/1-044) | MIL-S-8805 application requirements | 15 Amps A | 0,28-0,90 1-3.25 | 0,21 0.75 | 7,52 .296 | 4,37 .172 | 2,36 .093 | 19,1 .750 |
| BZ-2RW824-A2 | Operating in temperature to +250°F (121°C) | 15 Amps A | 0,7 2.5 | 0,14 0.5 | — | 5,56 .219 | 0,18-1,27 .007-.050 | 19,1 .750 |
| BZ-RW80X | Manual reset solder terminals | 15 Amps E | 0,63 2.25 | — | — | 5,56 .219 0,38* .015 | — — — | 19,05 .750 7,14* .281 |
| BZ-2RW863-A2 | 6 inch lever requirements | 15 Amps A | 0,28 1 | — | — | 12,7 .500 | 0,46-3,68 .018-.145 | 19,1±1,52 .750±.060 |
| BA-2RV-A2 | Up to 20 ampere load handling | 20 Amps G | 0,7 2.5 | 0,14 0.5 | 15,88 .625 | 1,98 .078 | 2,77 .109 | 19,1 .750 |
| BM-1RW84-A2 | Up to 22 ampere load handling | 22 Amps F | 0,28 1 | 0,03 0.125 | 7,54 .297 | 5,56 .219 | 0,13-0,84 .005-.033 | 19,1 .750 |
| BE-2RV-A4 | Up to 25 ampere load handling | 25 Amps H | 0,7 2.5 | 0,14 0.5 | 15,88 .625 | 1,98 .078 | 2,77 .109 max. | 19,1 .750 |

* Reset characteristics.

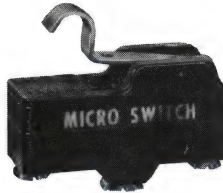
| | | | | | | | | |
|---------------------|--|---------------------|-------------------|--------------------|---|----------------------|-------------------------------|---------------------------------|
| BZ-2RW899-A2 | Adjustable operating point (17 mm to 22 mm) .670" to .880" | 15 Amps A | 0,7 2.5 | 0,14 0.5 | — | 3,54† .125 | 0,18-1,27 .007-.050 | 17,02-22,35 .670-.880 |
|---------------------|--|---------------------|-------------------|--------------------|---|----------------------|-------------------------------|---------------------------------|

| | | | | | | | | |
|------------------|---|---------------------|------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|
| BZ-2RM-A2 | Reverse acting actuator (switch plunger depressed in free position) | 15 Amps A | 1,67 6 | 0,28 1 | 5,56 .219 | 5,56 .219 | 0,10-0,89 .004-.035 | 19,1 .750 |
|------------------|---|---------------------|------------------|------------------|---------------------|---------------------|-------------------------------|---------------------|

† From $\frac{17 \text{ mm}}{.670 \text{ in.}}$ O.P.

Except where stated ** ±0.76 mm ±.030 in.

SIMULATED ROLLER



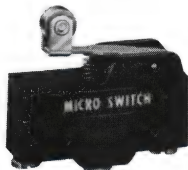
Dim. Dwg. Fig. 27

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 46 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.** mm inches |
|-----------------------|---|-------------------------------------|--------------------------|--------------------------|---------------------|---------------------|----------------------------|------------------------------|
| BZ-2RW80147-A2 | 1.05 inch (26,7 mm) (simulated roller) lever applications | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BZ-2RW80196-A2 | 1.90 inch (48,3 mm) (simulated roller) lever applications | 15 Amps A | 0,97 3.5 | 0,21 0.75 | — | 3,96 .156 | 0,10-1,0 .004-.040 | 30,17±0,76 1.188±.030 |

ROLLER LEVER

BZ/BM TYPE

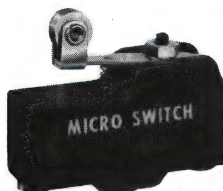


Dim. Dwg. Fig. 25



Dim. Dwg. Fig. 28

BA/BE TYPE



Dim. Dwg. Fig. 26

| | | | | | | | | |
|---------------------------|---|------------------|-------------------------|------------------|------------------|-----------------------|-----------------------------|--------------------|
| BZ-2RW82272-A2 | Applications requiring gold alloy contacts | 1 Amp P | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BZ-2RW822725551-A2 | Applications requiring gold alloy contacts plus dustproof and splash resistant seal | 1 Amp P | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BZ-2RW822-A2 | 1.05 inch (26,7 mm) (steel roller) lever applications | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BZ-2RW8222-A2 | Roller turned 90° | 15 Amps A | 0,7-1,81 2.5-6.5 | 0,35 1.25 | — | 3,58 .141 max. | 0,08-0,51 .003-.020 | 30,75 1.25 |
| BZ-2RW82224-A2 | Operating in temperature to +250°F (121°C) | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BZ-2RW8225551-A2 | Dustproof and splash resistant seal | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BZ-2RW82255-A2-S | Best service for sealed construction. Stainless steel internal snap spring. | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 30,17 1.188 |
| BA-2RV22-A2 | Up to 20 ampere load handling | 20 Amps G | 1,67 6 | 0,42 1.5 | 6,35 .250 | 0,76 .030 | 1,14 .045 max. | 29,77 1.172 |
| BM-1RW822-A2 | Up to 22 ampere load handling | 22 Amps F | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,025-0,33 .001-.013 | 30,17 1.188 |
| BE-2RV22-A4 | Up to 25 ampere load handling | 25 Amps H | 1,67 6 | 0,42 1.5 | 6,35 .250 | 0,76 .030 | 1,14 .045 max. | 29,77 1.172 |

| | | | | | | | | |
|-----------------------|--|------------------|-----------------|------------------|---|------------------|----------------------------|--------------------------------|
| BZ-2RW82299-A2 | Adjustable operating point. Roller lever 1.05 inch (26,7 mm) | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 1,02 .040 | 0,08-0,51 .003-.020 | 29,77-30,56 1.172-1.203 |
| BZ-2RW8299-A2 | Adjustable operating point. Roller lever 1.90 inch (48,3 mm) | 15 Amps A | 0,97 3.5 | 0,21 0.75 | — | 2,16 .085 | 0,10-1,0 .004-.040 | 29,2-31,5 1.150-1.24 |

Except where stated * ±0,38 mm
±.015 in.

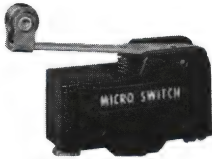
ROLLER LEVER

Characteristics:

O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel;
O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position.

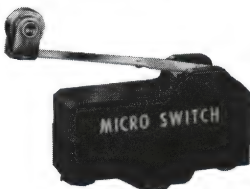
ORDER GUIDE

BZ/BM TYPE



Dim. Dwg. Fig. 29

BA/BE TYPE



Dim. Dwg. Fig. 30



Dim. Dwg. Fig. 31



Dim. Dwg. Fig. 32

| Catalog Listing | Recommended For | Electrical Data And UL Code Page 46 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.* mm inches |
|--------------------------|---|-------------------------------------|--------------------------|--------------------------|----------------------|---------------------|-------------------------------|---------------------------------|
| BZ-2RW82725551-A2 | Applications requiring gold alloy contacts, plus dustproof, and splash resistant seal | 1 Amp P | 0,97 3.5 | 0,21 0.75 | — | 3,96 .156 | 0,10-1,0 .004-.040 | 30,17±0,76 1.188±.030 |
| BZ-2RW82-A2 | 1.90 inch (48,3 mm) (steel roller) lever applications | 15 Amps A | 0,97 3.5 | 0,21 0.75 | — | 3,96 .156 | 0,10-1,0 .004-.040 | 30,17±0,76 1.188±.030 |
| BZ-2RW825551-A2 | Dustproof and splash resistant seal | 15 Amps A | 0,97 3.5 | 0,21 0.75 | — | 3,96 .156 | 0,10-1,0 .004-.040 | 30,17±0,76 1.188±.030 |
| BZ-2RW8224-A2 | Operating in temperature to +250°F (121°C) | 15 Amps A | 0,97 3.5 | 0,21 0.75 | — | 3,96 .156 | 0,10-1,0 .004-.040 | 30,17±0,76 1.188±.030 |
| BA-2RV2-A2 | Up to 20 ampere load handling | 20 Amps G | 0,97 3.5 | 0,14 0.5 | 11,89 .468 | 1,52 .060 | 2,16 .085 | 30,17±0,76 1.188±.030 |
| BM-1RW82-A2 | Up to 22 ampere load handling | 22 Amps F | 0,97 3.5 | 0,21 0.75 | — | 3,96 .156 | 0,08-0,56 .003-.022 | 30,17±0,76 1.188±.030 |
| BE-2RV2-A4 | Up to 25 ampere load handling | 25 Amps H | 0,97 3.5 | 0,14 0.5 | 11,89 .468 | 1,52 .060 | 2,16 .085 max. | 30,17±0,76 1.188±.030 |

NOTE: For adjustable operate point and simulated roller lever switches, refer to previous page.

| | | | | | | | | |
|--------------------|---------------------------------------|---------------------|-------------------|------------------|---------------------|---------------------|-----------------------------------|-----------------------|
| BZ-RW922-A2 | Best repeatability and O.P. stability | 10 Amps I | 3,34 12 | 1,11 4 | 0,38 .015 | 2,54 .100 | 0,013-0,025 .0005-.0010 | 31,37 1.235 |
|--------------------|---------------------------------------|---------------------|-------------------|------------------|---------------------|---------------------|-----------------------------------|-----------------------|

| | | | | | | | | |
|---------------------|---|---------------------|------------------|--------------------|---|---------------------|-------------------------------|-----------------------|
| BZ-2RW826-A2 | One-way roller (9,4 mm × 3,8 mm) .37" dia. × .15" wide roller | 15 Amps A | 1,67 6 | 0,42 1.5 | — | 2,39 .094 | 0,08-0,51 .003-.020 | 41,34 1.625 |
| BZ-2RW825-A2 | One-way roller (4,83 mm × 4,83 mm) .19" dia. × .19" wide roller | 15 Amps A | 2,22 8 | 0,42 1.5 | — | 1,52 .060 | 0,38 .015 | 28,96 1.14 |

Except where stated * ±0,38 mm
±.015 in.

FLEXIBLE LEAF

BZ TYPE



Dim. Dwg. Fig. 33

BA/BE TYPE



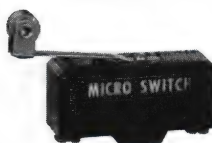
Dim. Dwg. Fig. 34

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.** mm inches |
|--------------------------------|---|--------------------------------------|--------------------------|--------------------------|---------------------|---|---------------------|--|
| BZ-2RL-A2 | Force and stability of the flexible leaf actuator | 15 Amps A | 1,39 5 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 17,48 .688 |
| BZ-2RL5551-A2 | Dustproof and splash resistant seal | 15 Amps A | 1,95 7 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 17,48 .688 |
| BZ-2RLT04 (M8805/1-001) | MIL-S-8805 application requirements | 15 Amps A | 1,39 5 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 17,48 .688 |
| BZ-2RL24-A2 | Operating in temperature to +250°F (121°C) | 15 Amps A | 1,39 5 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 17,48 .688 |
| BZ-RLX | Manual reset. Solder terminals | 15 Amps E | 0,83 3 | — — | — — | 1,57 .062 0,38* .015 | — — — — | 17,48 .688 7,14* .281 |
| BA-2RL-A2 | Up to 20 ampere load handling | 20 Amps G | 2,5 9 | 0,28 1 | — | 1,57 .062 | 1,57 .062 | 17,48 .688 |
| BE-2RL-A4 | Up to 25 ampere load handling | 25 Amps H | 2,5 9 | 0,28 1 | — | 1,57 .062 | 1,57 .062 | 17,48 .688 |

FLEXIBLE ROLLER LEAF

BZ TYPE



Dim. Dwg. Fig. 35

BA/BE TYPE



Dim. Dwg. Fig. 36

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|---------------------------------|--|--------------------------------------|----------------------------|--------------------------|---------------------|---------------------|---------------------|----------------------|
| BZ-RL24-A2 | Operating in temp. to +250°F (121°C) for 100 hours | 5 Amps B | 1,39 5 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 28,6 1.125 |
| BZ-2RL2-A2 | Force and stability of the flexible leaf with roller | 15 Amps A | 1,39 5 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 28,6 1.125 |
| BZ-2RL25551-A2 | Dustproof and splash resistant seal | 15 Amps A | 1,95 7 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 28,6 1.125 |
| BZ-2RL2T04 (M8805/1-036) | MIL-S-8805 application requirements | 15 Amps A | 1,04-1,39 3.75-5 | 0,14 0.5 | — | 1,52 .060 | 1,27 .050 | 28,6 1.125 |
| BA-2RL2-A2 | Up to 20 ampere load handling | 20 Amps G | 2,5 9 | 0,28 1 | — | 1,52 .060 | 1,65 .065 | 28,6 1.125 |
| BE-2RL2-A4 | Up to 25 ampere load handling | 25 Amps H | 2,5 9 | 0,28 1 | — | 1,52 .060 | 1,65 .065 | 28,6 1.125 |

* Reset characteristics

** ±0.76 mm
±.030 in.



GENERAL INFORMATION
SPECIAL CIRCUITRY SWITCHES

“Special sequence” switches provide unusual circuit control. A make-before-break switch provides circuit continuity while switching from N.C. to N.O. In another make-before-make switch, upon actuation, one circuit is made an interval before the second circuit. Another switch

provides a single pulse or momentary closure of the contacts with each cycle of operation.

Double break versions can interrupt greater inductive loads and feature shorting bar construction. A split contact version allows control of the two isolated circuits.

Characteristics: O.F. – Operating Force;
R.F. – Release Force; P.T. – Pretravel;
O.T. – Overtravel; D.T. – Differential Travel;
O.P. – Operating Position.

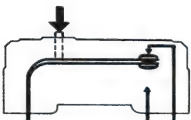
PIN PLUNGER

ORDER GUIDE



Dim. Dwg. Fig 5

| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.* mm inches |
|-----------------|----------------------------------|--------------------------------------|---------------------|--------------------------|---------------------|---------------------|----------------|-----------------|
| BZ-2G-A2 | Make-before-break contact action | 10 Amps C | 5,56 20 max. | 2,22 8 | 0,76 .030 | 0,13 .005 | 0,38 .015 | 15,9 .625 |



Unoperated



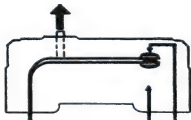
Intermediate



Fully Operated



Intermediate Release



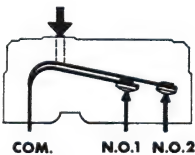
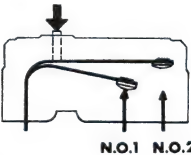
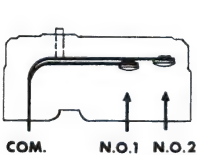
Fully Released



Dim. Dwg. Fig. 6

| | | | | | | | | |
|--------|---------------------------------|-----------|--------------|---------|---|---|---|---|
| 6BS1-B | Make-before-make contact action | 10 Amps R | 9,73 35 max. | 2,78 10 | - | - | - | - |
|--------|---------------------------------|-----------|--------------|---------|---|---|---|---|

*±0,38 mm
± .015 in.



Dim. Dwg. Fig. 4-A

| | | | | | | | | |
|---------|--------------------------------|-----------|-----------------|---------|---|---------------------------|--|----------|
| 10BS210 | Adjustable differential travel | 20 Amps Y | 3,10-5,56 11-20 | 2,78 10 | - | 0,25 .010 at max. setting | 0,04-0,06 .0015-.0025 0,18 .007 at max. setting | 16,3 .64 |
|---------|--------------------------------|-----------|-----------------|---------|---|---------------------------|--|----------|

Basic Switches

Standard

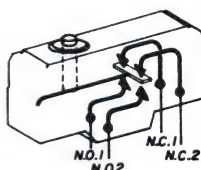
BZ/BA Series

PIN PLUNGER — SPECIAL CIRCUITRY

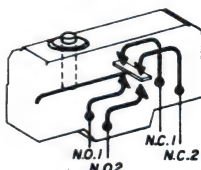
ORDER GUIDE



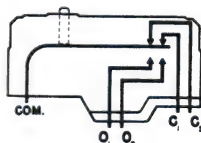
Dim. Dwg. Fig. 8



Dim. Dwg. Fig. 9



Dim. Dwg. Fig. 10



| Catalog Listing | Recommended For | Electrical Data and UL Codes Page 46 | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.* mm inches |
|-------------------|---|--------------------------------------|---------------------------|--------------------------|---------------------|---------------------|--------------------------------|---------------------------------|
| BZ-3AT | Double-break, low voltage DC applications | 15 Amps T | 4,45-7,23 16-26 | 1,11 4 | 0,76 .030 | 0,13 .005 | 0,051-0,13 .002-.005 | 15,9 .625 |
| BZ-2AW80T | As above, with 2.5 inch lever | 15 Amps T | 0,90 3.25 | 0,14 .25 | — — | 5,56 .219 | 0,51 2.54 | 19,05±0,76 .750±.030 |
| BZ-2AW82T | As above, with 1.9 inch roller lever | 15 Amps T | 1,25 4.5 | 0,21 .75 | — — | 3,96 .156 | 0,38-1,91 .015-.075 | 30,18±0,76 1.188±.030 |
| BZ-2AW822T | As above, with 1.05 inch roller lever | 15 Amps T | 2,36 8.5 | 0,42 1.5 | — — | 2,39 .094 | 0,20-2,39 .008-.030 | 30,18±0,76 1.188±.030 |

| | | | | | | | | |
|---------------|---|---------------------|---------------------------|-------------------|---------------------|---------------------|-------------------------------|---------------------|
| BA-3ST | Double-break, low voltage DC applications | 25 Amps M | 7,23-10,6 26-38 | 2,78 10 | 1,65 .065 | 0,25 .010 | 0,18-0,38 .007-.015 | 16,3 .640 |
|---------------|---|---------------------|---------------------------|-------------------|---------------------|---------------------|-------------------------------|---------------------|

| | | | | | | | | |
|---------------------------|--|--------------------|---------------------------|--------------------|---------------------|---------------------|-------------------------------|---------------------------------|
| BZ-3YT (MS25383-1) | MIL-S-8805 application requirements. (split contact) | 5 Amps U | 4,45-7,23 16-26 | 1,11 4 | 0,76 .030 | 0,13 .005 | 0,025-0,1 .001-.004 | 15,9 .625 |
| BZ-3YWT80 | As above, with 2.50 inch lever | 5 Amps U | 0,97 3.5 | 0,14 .5 | — — | 5,56 .219 | 0,51-2,54 .020-.100 | 19,05±0,76 .750±.030 |
| BZ-3YWT82 | As above, with 1.9 inch roller lever | 5 Amps U | 1,25 4.5 | 0,21 .75 | — — | 3,96 .156 | 0,38-1,91 .015-.075 | 30,18±0,76 1.188±.030 |
| BZ-3YWT822 | As above, with 1.05 inch roller lever | 5 Amps U | 1,95 7 | 0,42 1.5 | — — | 2,39 .094 | 0,20-1,02 .008-.040 | 30,19 .188 |

Except where stated * ±0,38 mm
±.015 in.

Standard
Basic Switches

Basic Switches

Standard

BZ/BA Series

MOUNTING DIMENSIONS (For reference only)

PIN PLUNGERS

BZ/BM

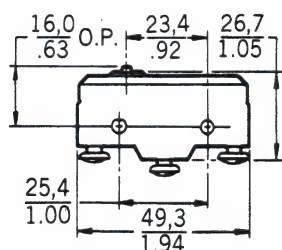


Fig. 1

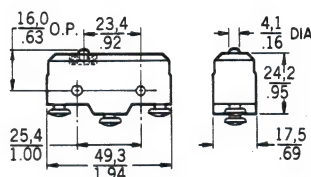


Fig. 2

BA/BE

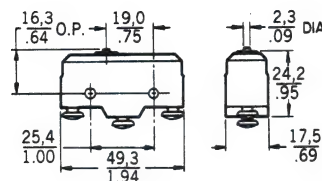


Fig. 3

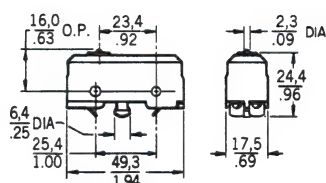


Fig. 4

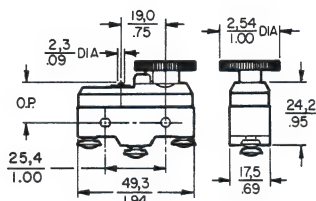


Fig. 4-A

PIN PLUNGERS — SPECIAL CIRCUITRY

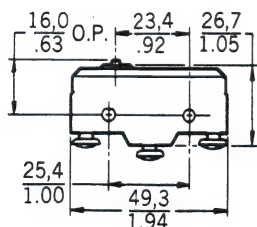


Fig. 5

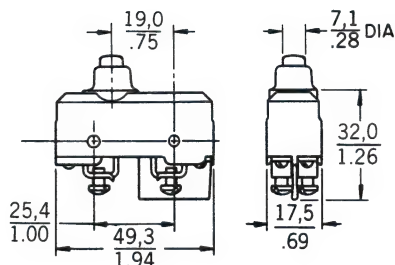


Fig. 6

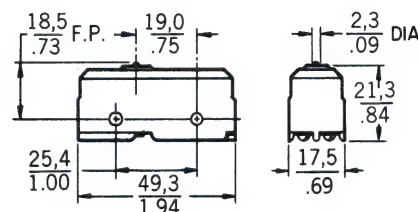


Fig. 7

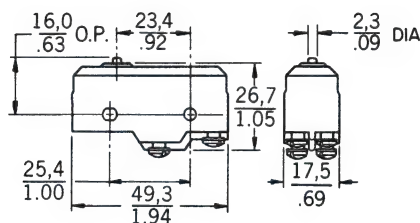


Fig. 8

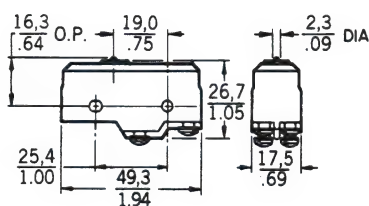


Fig. 9

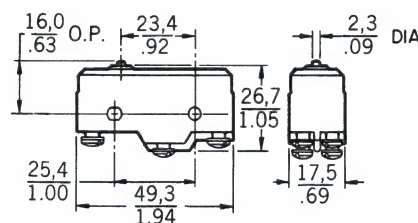


Fig. 10

Mounting holes accept pins or screws of .139" (3.53 mm) diameter.

Key: 0.0 = mm
0.00 = inches

Basic Switches Standard

BZ/BA Series

MOUNTING DIMENSIONS (For reference only)

OVERTRAVEL PLUNGERS

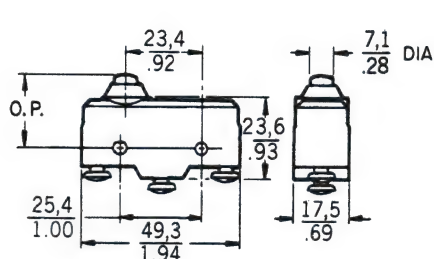


Fig. 11

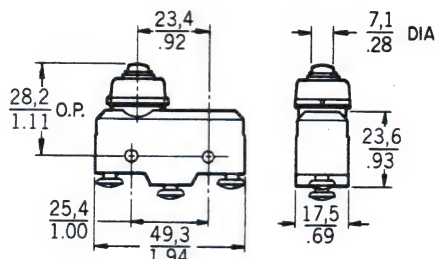


Fig. 12

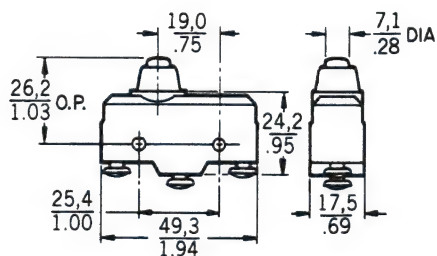


Fig. 13

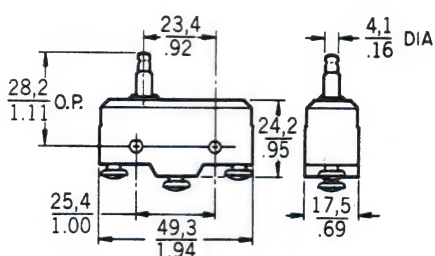


Fig. 14

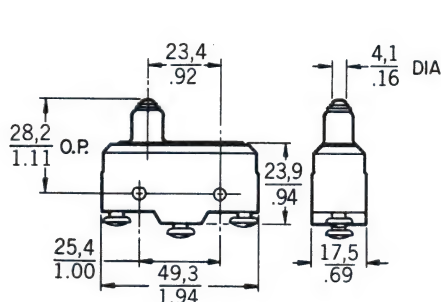


Fig. 15

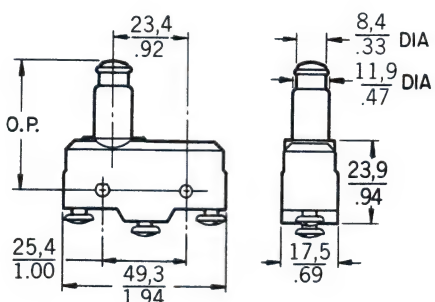
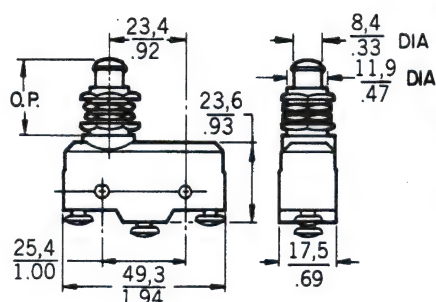
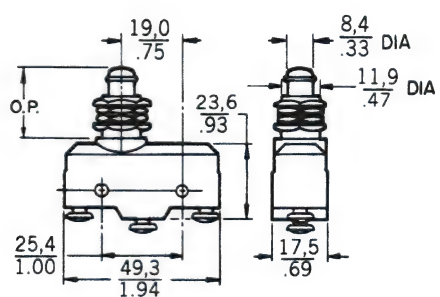


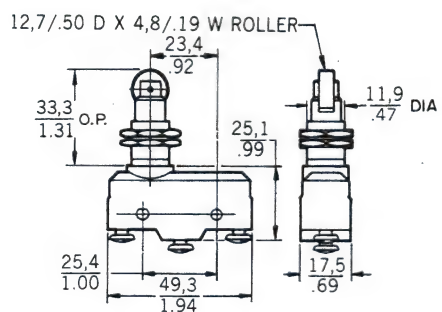
Fig. 16



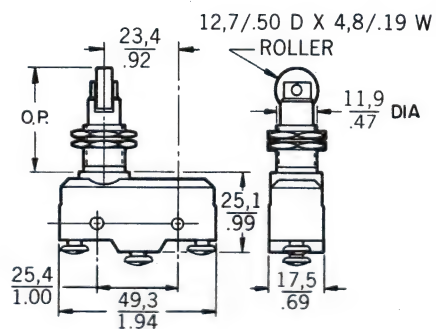
*Fig. 17



*Fig. 18



*Fig. 19



*Fig. 20

* Threaded bushings are 15/32-32ns.

Standard
Basic Switches

Basic Switches

Standard

BZ/BA Series

MOUNTING DIMENSIONS (For reference only)

STRAIGHT LEVERS

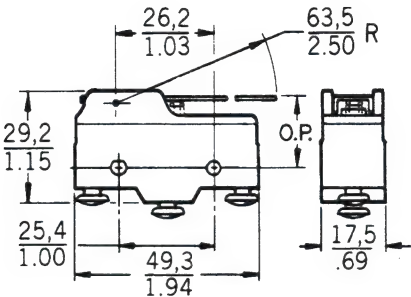


Fig. 21

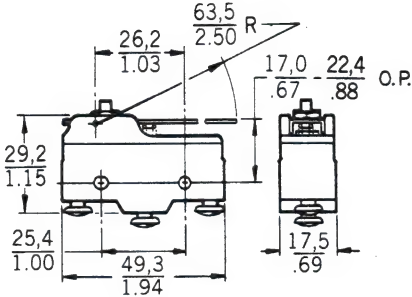


Fig. 22

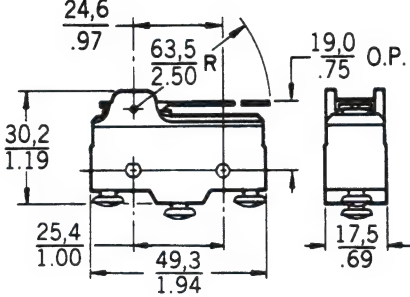


Fig. 23

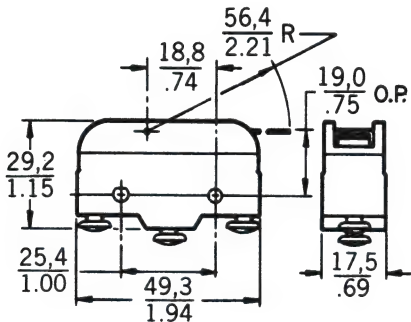


Fig. 24

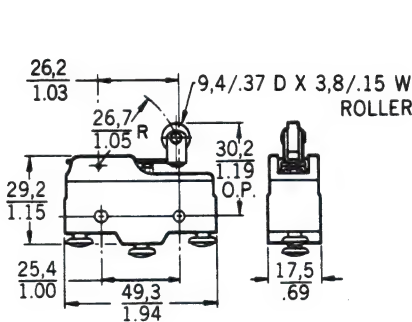
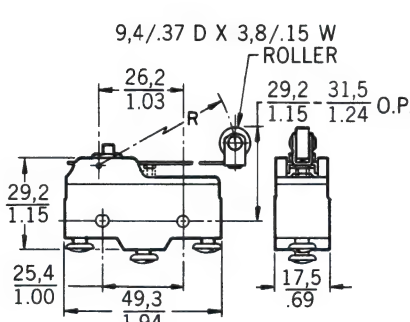


Fig. 25



R = 26,7/1.05 FOR BZ-2RW82299-A2
48,3/1.90 FOR BZ-2RW82299-A2

Fig. 26

FLEXIBLE LEAF ACTUATOR

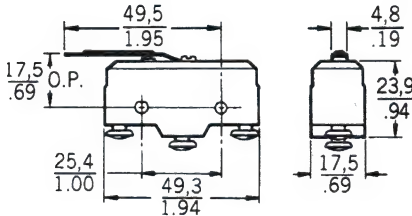


Fig. 33

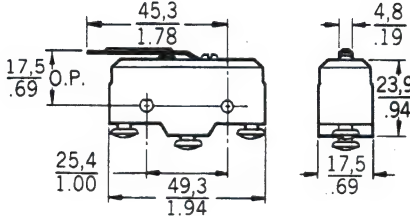


Fig. 34

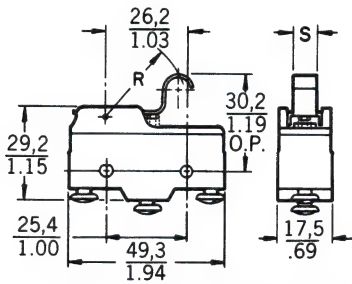
Basic Switches

Standard

BZ/BA Series

MOUNTING DIMENSIONS

ROLLER LEVERS



R = 26,7/1.05 FOR BZ-2RW80147-A2
48,3/1.90 FOR BZ-2RW80196-A2
S = 7,9/.31 FOR BZ-2RW80147-A2
4,8/.19 FOR BZ-2RW80196-A2

Fig. 27

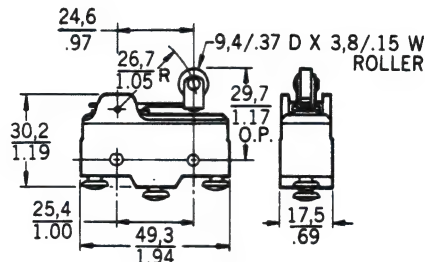


Fig. 28

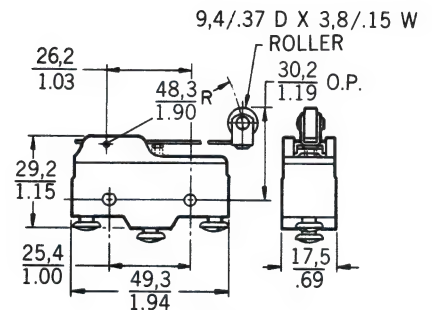


Fig. 29

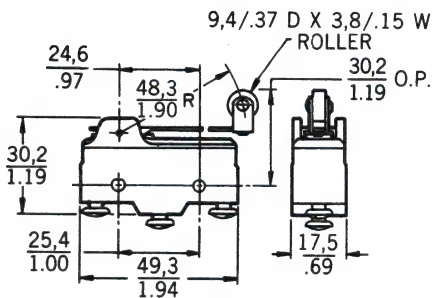


Fig. 30

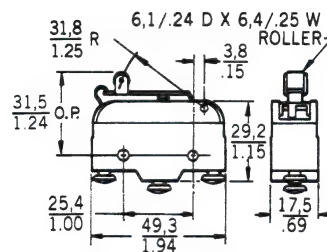
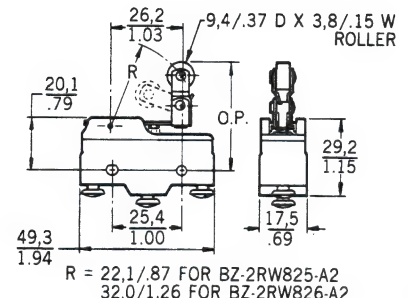


Fig. 31



R = 22,1/.87 FOR BZ-2RW825-A2
32,0/1.26 FOR BZ-2RW826-A2

Fig. 32

FLEXIBLE ROLLER LEAF

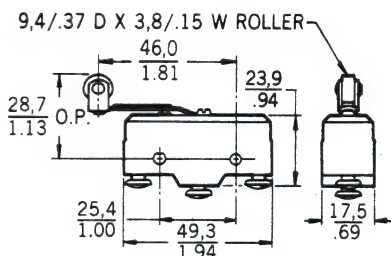


Fig. 35

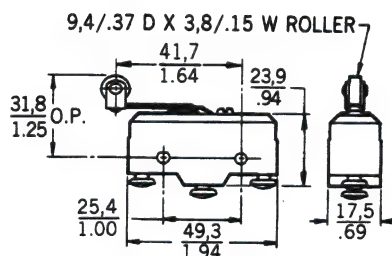


Fig. 36

Mounting holes accept pins or screws of .139" (3,53 mm) diameter.

Key: 0,0 = mm
0.00 = inches

Basic Switches

Auxiliary Actuators Standard Basic



FEATURES

- Additional overtravel
- Quick, easy installation
- Corrosion resistance
- MIL-S-8805 listed units

NOTE: Switches shown are not included with the actuator. All actuators are for use with pin plunger types only except catalog listing JR.

GENERAL INFORMATION

Auxiliary actuators adapt the plunger-type standard basic switches to many application needs. Auxiliary actuators minimize the need for a large inventory of switch types. Actuators and switches are sold as separate items and must be ordered separately. Mounting hardware is furnished with the actuator.

Characteristics:

O.T. — Overtravel;
O.P. — Operating Position;
F.P. — Free Position.

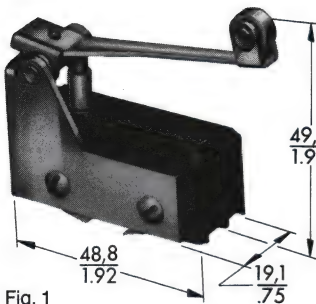


Fig. 1

ORDER GUIDE

| Description | Catalog Listing | Use Only With | O.T. min. mm inches | O.P.* mm inches | F.P. max. mm inches |
|---|-----------------|---------------|---------------------------|-------------------------|---------------------------|
| Roller lever for "S" plunger type BZ and DT switches only. Permits cam operation. | JR | BZ DT | 11.1 .437 | 44,45±3,18 1.75±.125 | |

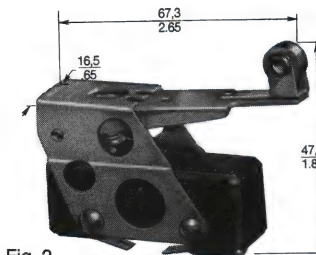


Fig. 2

| | | | | | |
|--|----------------------------------|----------|-------------------------|---------------------------|------------------------|
| Adjustable roller lever. Tang on top of actuator can be bent to adjust O.P. and F.P. | AD5721R (8805/59) AN3169-1 | BZ BM | 11,1 .437 approx. | 31,75-41,15 1.25-1.62 | 39,6-43,7 1.56-1.72 |
| | ADA3721R | BA BE | 9,53 .375 approx. | 40,48 1.594 approx. | 43,03 1.812 |
| | ADD3721R | DT MT | 9,53 .375 approx. | 39,6 1.562 approx. | 46,03 1.812 |

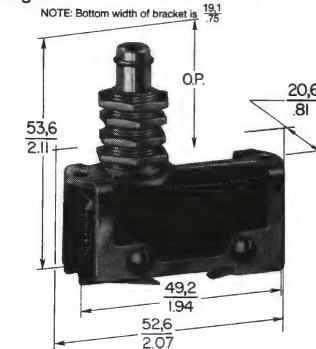


Fig. 3

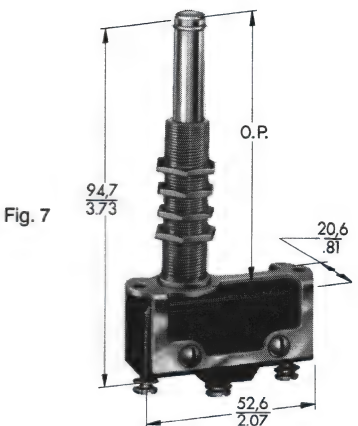
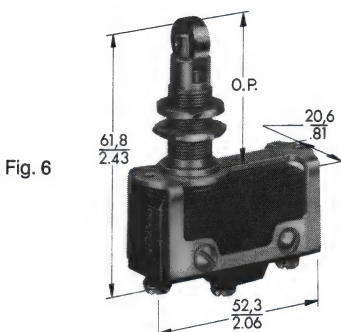
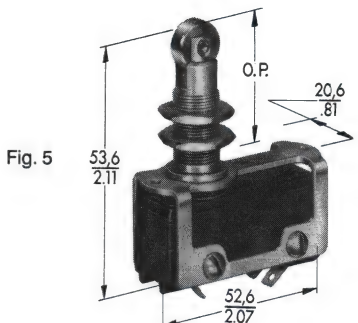
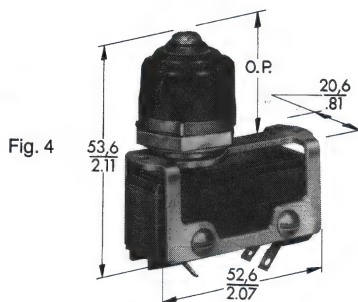
| | | | | | |
|--------------------------------|---------------------------------|----------|--------------|----------------|----------------|
| Straight plunger. Panel mount. | MC2711 (8805/59) AN3168-2 | BZ BM | 4,78 .188 | 27,79 .188 | 29,4 1.156 |
| | MCA2711 | BA BE | 3,96 .156 | 28,17 1.109 | 30,18 1.188 |
| | MCD2711 | DT MT | 3,58 .141 | 27,79 1.094 | 30,18 1.188 |

Dimensions shown are for reference only.

Except where stated * ±1,14 mm
±.045 in.

Basic Switches

Auxiliary Actuators Standard Basics



ORDER GUIDE

| Description | Catalog Listing | Use Only With | O.T. min. mm Inches | O.P.* mm Inches | F.P. max. mm Inches |
|--|-----------------|---------------|---------------------------|--------------------------|---------------------------|
| Sealed straight plunger. Panel mount. Elastomer seal boot keeps out liquid splash and dirt. Furnished unassembled. | MC2711H | BZ BM | 4,78 .188 | 28,98 1.141 | 29,4 1.156 |
| | MCA2711H | BA BE | 4,37 .172 | 27,38±0,76 1.078±.030 | 29,56 1.156 |
| | MCD2711H | DT MT | 3,58 .141 | 27,79 1.094 | 30,18 1.188 |

| | | | | | |
|--|----------|----------|-------------------------|----------------|----------------|
| Roller plunger. Panel mount. Roller parallel to long axis of the switch. | MD3211Q | BZ BM | 3,18 .125 approx. | 35,7 1.406 | 37,69 1.484 |
| | MDA3711Q | BA BE | 3,18 .125 | 36,12 1.422 | 37,69 1.484 |
| | MD3211Q | DT MT | 3,18 .125 | 35,7 1.406 | 37,69 1.484 |

| | | | | | |
|---|-----------|----------|-------------------------|----------------|----------------|
| Cross roller plunger. Panel mount. Roller perpendicular to long axis of the switch. | MD3211Q1 | BZ BM | 3,18 .125 approx. | 35,7 1.406 | 37,69 1.484 |
| | MDA3711Q1 | BA BE | 3,18 .125 | 36,12 1.422 | 37,69 1.484 |
| | MD3211Q1 | DT MT | 3,18 .125 | 35,7 1.406 | 37,69 1.484 |

| | | | | | |
|--|---------------------------------|----------|---------------|----------------|----------------|
| High overtravel plunger. Panel mount. | MC7711 (8805/58) AN3167-1 | BZ BM | 20,62 .812 | 69,1 2.719 | 70,64 2.781 |
| | MCA7711 | BA BE | 19,84 .781 | 69,44 2.734 | 71,42 2.812 |
| | MCD7711 | DT MT | 18,26 .719 | 69,1 2.719 | 71,42 2.812 |

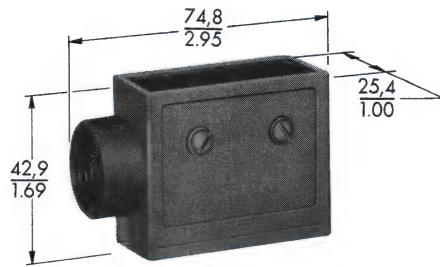
Except where stated* ±1,14 mm
±.045 in.

Basic Switches

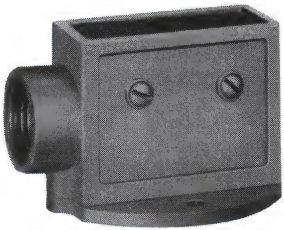
Accessories Standard Basics

DIE CAST ZINC ENCLOSURES

Width of opening .74" (18,8 mm)



3PA1



3PA2*

*Width of base is 2.125 inches (54 mm) and mounting hole centers are 1.625 inches (41,3 mm) apart.

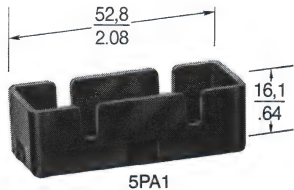
FEATURES

- Protect switch from physical abuse
- Protect personnel from contact with exposed terminals
- Provide rugged mounting means
- 1/2-14NPT internal thread conduit hub

ORDER GUIDE

| Catalog Listing | Description |
|-----------------|--|
| 3PA1 | Side mount enclosure—Can be mounted from either side through .140" (3,55mm) dia. holes on 1" (25,4mm) centers. |
| 3PA28 | Side mount enclosure—Can be mounted from either side through .140" (3,55mm) dia. holes on 1" (25,4mm) centers. 1/2-14 NPSM internal thread conduit hub. |
| 3PA2 | Flange mount enclosure—Switch is first secured in enclosure; two 0.172" (4,37mm) dia. holes in the flange accept #8 machine screws for mounting on 1.625 (41,3mm) centers. |
| 3PA6 | Side mount enclosure—For use with actuator Fig. 2 page 58. |

PLASTIC TERMINAL ENCLOSURES



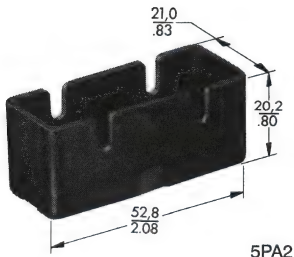
5PA1



5PA1 WITH SWITCH ASSEMBLY

FEATURES

- Easy to use
- Screw and solder terminal versions
- Protect personnel from contact with exposed terminals



5PA2

ORDER GUIDE

| Catalog Listing | Description |
|-----------------|---|
| 5PA1 | For solder terminal switches |
| 5PA2 | For screw terminal switches |
| 5PA3 | For solder or screw terminal switches with auxiliary actuators assembled. |

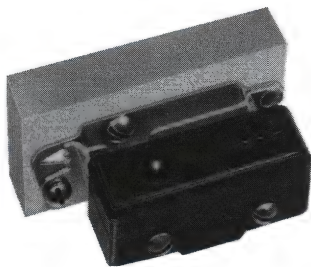
Dimensions shown are for reference only.

Switches are not included with enclosures.

Basic Switches

Accessories Standard Basics

ADJUSTABLE MOUNTING BRACKETS



8MA1 WITH SWITCH
ASSEMBLED

FEATURES

- Sturdy plated steel construction
- Fast, easy screwdriver adjustment
- Can be used with all standard basic switches

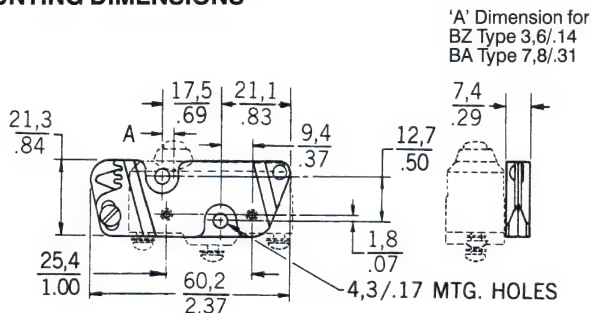
GENERAL INFORMATION

The operation point of a basic switch can be regulated up to .080" (2 mm) by loosening the locking screw, inserting a screwdriver in the adjusting slot, and twisting.

ORDER GUIDE

| Catalog Listing | Description |
|-----------------|--|
| 8MA1 | Adjustable mounting bracket, adjustment slot on the left. |
| 8MA2 | Adjustable mounting bracket, adjustment slot on the right. |

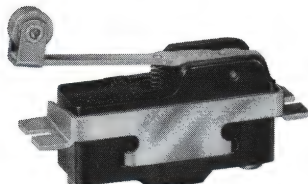
MOUNTING DIMENSIONS



CONVERSION MOUNTING BRACKET



17MA1-B



17MA1-B WITH SWITCH
ASSEMBLED

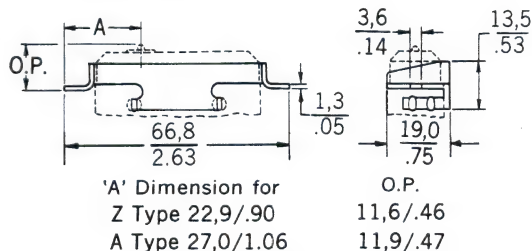
FEATURES

- Converts standard basic switches from side to top mount
- Corrosion resistant
- Snaps into switch mounting holes—without tools

ORDER GUIDE

| Catalog Listing | Description |
|-----------------|------------------------------|
| 17MA1-B | Conversion mounting bracket. |

MOUNTING DIMENSIONS

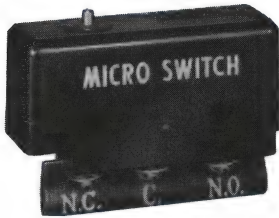


Switches are not included with bracket.

Basic Switches

Double-pole Double-throw

DT Series

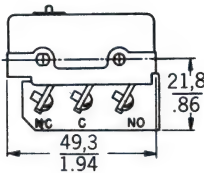


FEATURES

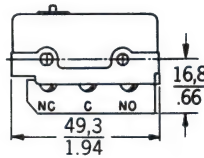
- Two independent single-pole double-throw circuits on one housing
- Design permitting several wiring combinations
- Savings in space and weight
- Mounting interchangeability with type Z switches
- Temperature tolerance to +180°F (82°C)
- UL recognized, CSA certified

AVAILABLE TERMINALS

B6
6-32 UNC x .188"
(No. 5 pan head screws)



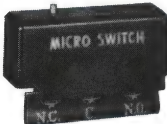
A7
4-40 UNC x .125"
Screws with lockwashers.
Fiberglass insulator isolates
terminals and prevents
accidental shorting.



ELECTRICAL RATING

| Circuitry | Electrical Data and UL Codes |
|------------------------------|---|
| Double-pole double-throw | J 10 amps, 125 or 250 vac; 0.3 amp, 125 vdc; 0.15 amp, 250 vdc. UL Code L59 |

DOUBLE-POLE DOUBLE THROW



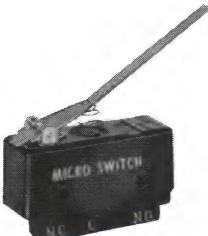
Dim. Dwg. Fig. 1



Dim. Dwg. Fig. 9



Dim. Dwg. Fig. 3



Dim. Dwg. Fig. 2

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position.

ORDER GUIDE

| Catalog Listing | Description | Electrical Data and UL Code | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. mm inches | D.T. max. min. mm inches | O.P.* mm inches |
|-------------------------------------|-------------|-----------------------------|---------------------------|--------------------------|---------------------|---------------------|-------------------------------|--------------------------|
| DT-2R-A7 MS25008-1 | Pin plunger | 10 Amps J | 3,34-5,56 12-20 | 0,56 2 | 1,91 .075 | 0,13 .005 | 1,02-1,52 .040-.060 | 15,6 .615±.015 |

| | | | | | | | | |
|-------------------|------------------|---------------------|---------------------------|------------------|---------------------|---------------------|-------------------------------|-------------------------------|
| DT-2RS1-A7 | Straight plunger | 10 Amps J | 3,34-5,56 12-20 | 0,28 1 | 1,91 .075 | 0,51 .020 | 1,02-1,52 .040-.060 | 28,2±0,38 1.11±.015 |
|-------------------|------------------|---------------------|---------------------------|------------------|---------------------|---------------------|-------------------------------|-------------------------------|

| | | | | | | | | |
|-------------------|---|---------------------|-------------------------|--------------------|---------------------|---------------------|-------------------------------|---------------------|
| DT-2RV3-A7 | Straight lever Reversed lever position | 10 Amps J | 1,11-1,95 4-7 | 0,14 0.5 | 6,86 .270 | 0,25 .010 | 2,92-4,83 .115-.190 | 18,3 .719 |
|-------------------|---|---------------------|-------------------------|--------------------|---------------------|---------------------|-------------------------------|---------------------|

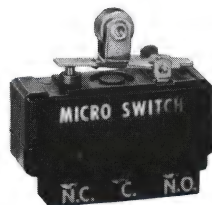
| | | | | | | | | |
|------------------|----------------|---------------------|---------------------------|------------------|------------------|---------------------|-------------------------------|---------------------|
| DT-2RV-A7 | Straight lever | 10 Amps J | 0,97-1,67 3.5-6 | 0,28 1 | 25,4 1 | 1,57 .062 | 12,4-19,2 .490-.755 | 21,8 .859 |
|------------------|----------------|---------------------|---------------------------|------------------|------------------|---------------------|-------------------------------|---------------------|

Except where stated * ±0,76 mm
±.030 in.

Basic Switches

Double-pole Double-throw

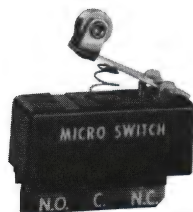
DT Series



Dim. Dwg. Fig. 8

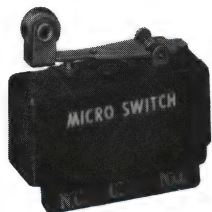
ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Data and UL Codes | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|---------------------|--------------------------------------|------------------------------|--------------------------|--------------------------|---------------------|---------------------|-------------------------------|--------------------|
| DT-2RV216-A7 | Roller lever (centered steel roller) | 10 Amps J | 11,1 2.5 lbs. | 1,11 4 | 1,02 .040 | 0,13 .005 | 0,51-0,76 .020-.030 | 31 1.219 |



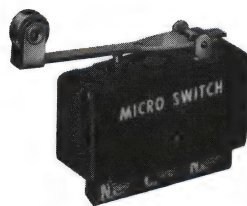
Dim. Dwg. Fig. 5

| | | | | | | | | |
|--------------------|--|---------------------|-------------------------|------------------|---------------|---------------------|-------------------------------|--------------------------------|
| DT-2RV22-A7 | 1.03 inch (26,2mm) roller lever (steel roller) | 10 Amps J | 2,5-3,89 9-14 | 0,83 3 | — — | 0,79 .031 | 4,95-7,75 .195-.305 | 30,2±0,38 1.188±.015 |
|--------------------|--|---------------------|-------------------------|------------------|---------------|---------------------|-------------------------------|--------------------------------|



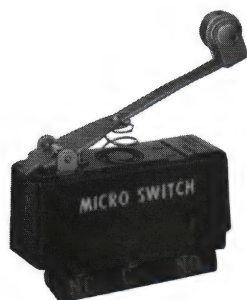
Dim. Dwg. Fig. 7

| | | | | | | | | |
|---------------------|--------------------------------------|---------------------|-------------------------|--------------------|--------------------|---------------------|-------------------------------|----------------------|
| DT-2RV212-A7 | Roller lever Reversed lever position | 10 Amps J | 2,5-4,17 9-15 | 0,42 1.5 | 3,3 .130 | 0,13 .005 | 1,27-2,16 .050-.085 | 29,4 1.156 |
|---------------------|--------------------------------------|---------------------|-------------------------|--------------------|--------------------|---------------------|-------------------------------|----------------------|



Dim. Dwg. Fig. 6

| | | | | | | | | |
|--------------------|--------------------------------------|---------------------|-----------------------------|--------------------|---------------------|---------------------|-------------------------------|----------------------|
| DT-2RV23-A7 | Roller lever Reversed lever position | 10 Amps J | 1,53-2,64 5.5-9.5 | 0,21 .75 | 4,45 .175 | 0,25 .010 | 2,16-3,43 .085-.135 | 29,4 1.156 |
|--------------------|--------------------------------------|---------------------|-----------------------------|--------------------|---------------------|---------------------|-------------------------------|----------------------|



Dim. Dwg. Fig. 4

| | | | | | | | | |
|-------------------|---|---------------------|-----------------------------|--------------------|---------------|---------------------|-------------------------------|----------------------|
| DT-2RV2-A7 | 1.90 inch (48,3 mm) roller lever (steel roller) | 10 Amps J | 1,25-2,09 4.5-7.5 | 0,42 1.5 | — — | 1,19 .047 | 9,27-14,4 .365-.565 | 31,8 1.250 |
|-------------------|---|---------------------|-----------------------------|--------------------|---------------|---------------------|-------------------------------|----------------------|

Except where stated * ±0,76 mm ±.030 in.

Auxiliary actuators see page 68-69.

Standard
Basic Switches

Double-pole Double-throw

MOUNTING DIMENSIONS (For reference only)

PIN PLUNGER

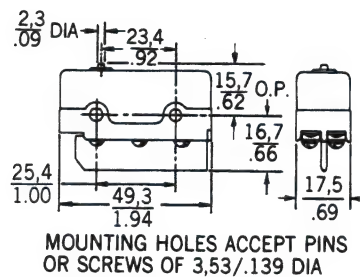


Fig. 1

STRAIGHT LEVER

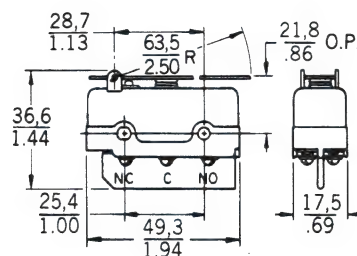


Fig. 2

STRAIGHT LEVER

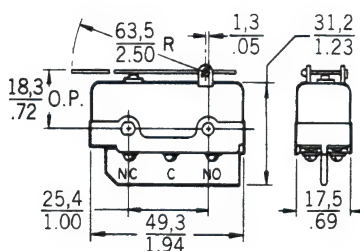


Fig. 3

ROLLER LEVER

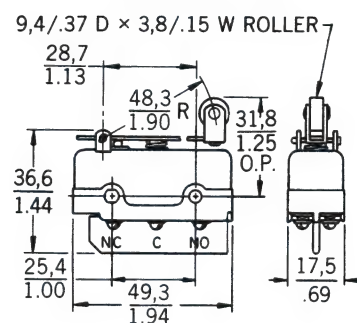


Fig. 4

Key: $\frac{0.0}{0.00} = \frac{\text{mm}}{\text{inches}}$

Basic Switches

Double-pole Double-throw

DT Series

MOUNTING DIMENSIONS (For reference only)

ROLLER LEVER

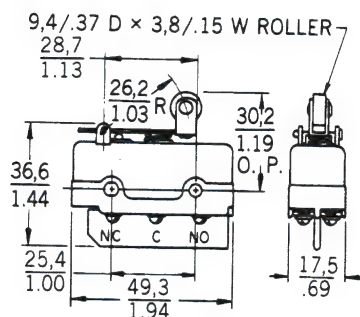


Fig. 5

ROLLER LEVER

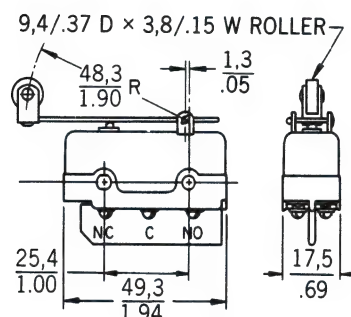


Fig. 6

ROLLER LEVER

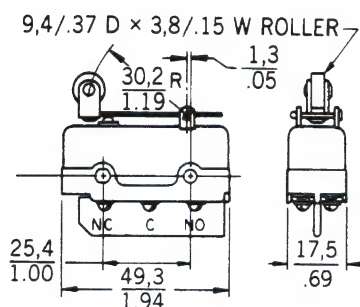


Fig. 7

ROLLER LEVER

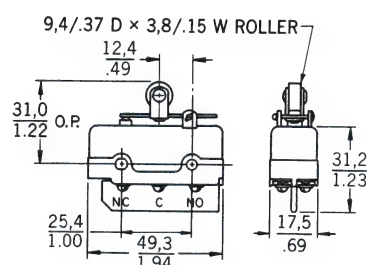


Fig. 8

STRAIGHT PLUNGER

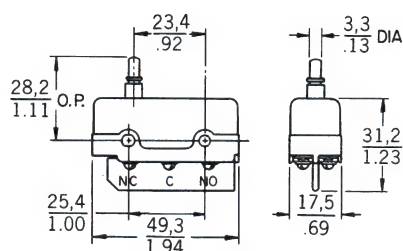


Fig. 9

Standard
Basic Switches

Basic Switches
Magnetic Blow-out

MT Series



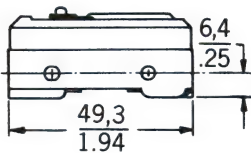
FEATURES

- Arc resistant case
- Mechanical life of 100,000 operations — 95% survival
- Temperature tolerance to +180°F (82°C)
- Mounting interchangeability with Z switches
- UL recognized

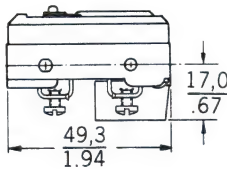
GENERAL INFORMATION

MT (single-pole double-throw) magnetic blow-out switches are designed to switch high capacity (125 and 250 VDC) systems. An integral magnet around the contact gap protects the contacts by deflecting the arc. Vents between the cover and housing allow the hot gas to escape. These switches are designed for the control of DC motors, solenoids, etc.

AVAILABLE TERMINALS



Solder (No listing designation)



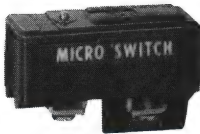
A28
6-32NC x .218" Screws
will accept up to #12 wire.

ELECTRICAL RATING

| Circuitry | Electrical Data and UL Codes |
|--|--|
| Single-pole double-throw unless otherwise noted in order guide | <p>K Rating established with switch non-polarized 10 amps, 125 vac or vdc; 1/4 hp, 125 vac or vdc. UL Code L 168</p> <p>Non-polarized: 10 amps res. or 1/4 hp, 125 vdc; 3 amps max. res. 250 vdc.</p> <p>Polarized*: 10 amps res. or 1/2 hp, 125 vdc; 3 amps max. res., 250 vdc.</p> <p>*To polarize, connect negative side of line to common terminal. To achieve the same effect, mount switch with brass screws, using a non-magnetic barrier (at least 1/4" thick) between the switch and mounting surface.</p> |

Characteristics: O.F. – Operating Force;
R.F. – Release Force; P.T. – Pretravel;
O.T. – Overtravel; D.T. – Differential Travel;
O.P. – Operating Position.

ORDER GUIDE



Dim. Dwg. Fig. 1

| Catalog Listing | Recommended For | Electrical Data and UL Codes | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
|-----------------|------------------|------------------------------|---------------------|--------------------------|---------------------|---------------------|---------------------|---------------------|
| MT-4R-A28 | Pin plunger SPDT | 10 Amps K | 3,34-5,0 12-18 | 1,39 5 | 1,02 .04 | 0,13 .005 | 0,1-0,18 .004-.007 | 15,9±0,38 .625±.015 |

Basic Switches

Magnetic Blow-out

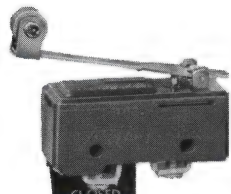
MT Series

ORDER GUIDE



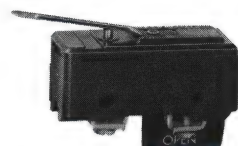
Dim. Dwg. Fig. 2

| Catalog Listing | Description | Electrical Data and UL Codes | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|-------------------|----------------|------------------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|---------------------|
| MT-4RV-A28 | Straight lever | 10 Amps K | 0,56 2 | 0,14 0.5 | 12,7 0.5 | 1,19 .047 | 2,16 .085 | 19,1 .750 |



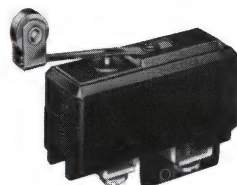
Dim. Dwg. Fig. 3

| | | | | | | | | |
|---------------------|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|
| MT-4RV2-A28 | 1.90 inch (48,3mm) lever with hardened steel roller | 10 Amps K | 0,76 2.75 | 0,07 0.25 | 8,89 0.35 | 0,79 .031 | 1,65 .065 | 30,2 1.188 |
| MT-4RV22-A28 | 1.03 inch (26,2mm) lever with hardened steel roller | 10 Amps K | 1,25 4.5 | 0,28 1 | 5,08 .200 | 0,38 .015 | 0,89 .035 | 31,3 1.234 |



Dim. Dwg. Fig. 4

| | | | | | | | | |
|-------------------|----------------------------------|---------------------|-------------------|------------------|---|--------------------------|---|---------------------|
| MT-4RL-A28 | 1.95 inch (49,5mm) flexible leaf | 10 Amps K | 3,34 12 | 0,28 1 | — | 1,52 .060 max. | — | 19,1 .750 |
|-------------------|----------------------------------|---------------------|-------------------|------------------|---|--------------------------|---|---------------------|



Dim. Dwg. Fig. 5

| | | | | | | | | |
|--------------------|---|---------------------|-------------------|------------------|---|--------------------------|---|----------------------|
| MT-4RL2-A28 | 1.82 inch (46,2mm) flexible leaf with hardened steel roller | 10 Amps K | 3,34 12 | 0,28 1 | — | 1,52 .060 max. | — | 30,2 1.188 |
|--------------------|---|---------------------|-------------------|------------------|---|--------------------------|---|----------------------|

Except where stated * $\pm 0,76$ mm
 $\pm .030$ in.

Standard
Basic Switches

Basic Switches

Magnetic Blow-out

MT Series

MOUNTING DIMENSIONS (For reference only)

PIN PLUNGER

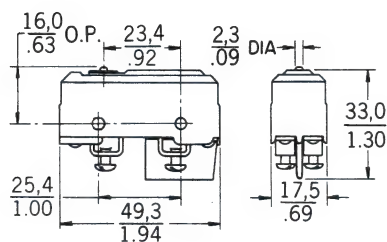


Fig. 1

STRAIGHT LEVER

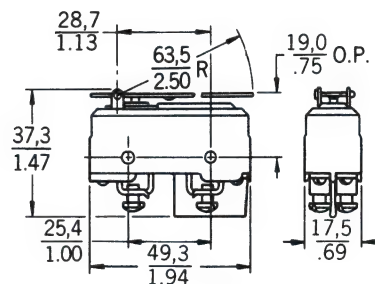


Fig. 2

ROLLER LEVER

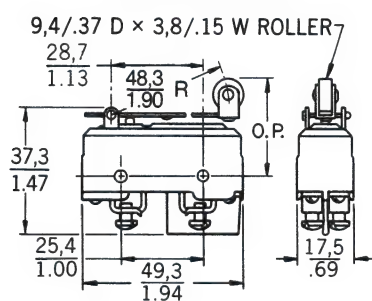


Fig. 3

FLEXIBLE LEAF

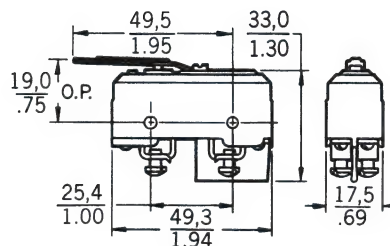


Fig. 4

FLEXIBLE ROLLER LEAF

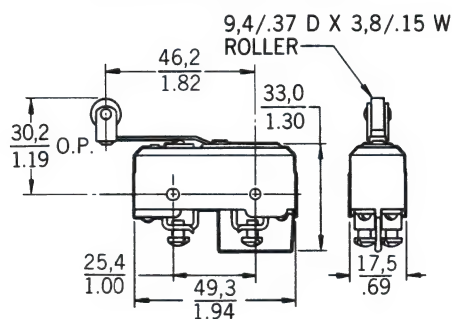
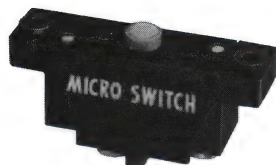


Fig. 5

Mounting holes accept pins or screws of .139" (3.53 mm) diameter.

Key: $\frac{0.0}{0.00} = \frac{\text{mm}}{\text{inches}}$



FEATURES

- .080 inch minimum overtravel
- Power load switching capability up to 15 amperes
- Motor handling capacity of 1 horsepower at 240 vac.
- Long mechanical life of 10,000,000 cycles—95% survival
- Arc resistant plastic
- More space between terminals to reduce possibility of shorting
- #8 Terminal screws
- UL recognized, CSA certified

GENERAL INFORMATION

3MN switches are for use with limit or control mechanisms on machine tools, presses or other industrial equipment.

These switches provide easy gang mounting.

The terminals of double-break switches must be wired to identical voltage sources and the same polarity. The loads should be on the same sides of the lines.

ELECTRICAL RATING

| Circuitry | Electrical Data and UL Codes |
|-----------|--|
| | V Motor Control 15 amps, 120, 240, 480 or 600 vac; 1/2 hp, 120 vac; 1 hp, 240 vac; 0.8 amp, 115 vdc; 0.4 amp, 230 vdc. |

ORDER GUIDE

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

| Catalog Listing | Description | Electrical Data and UL Codes | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. mm inches | O.P.* max. mm inches |
|-----------------|-----------------------|------------------------------|---------------------------|--------------------------|---------------------|---------------------|-------------------------------|----------------------|
| 3MN1 | For most applications | 15 Amps V | 3,34-5,56 12-20 | 1,67 6 | 1,52 .060 | 2,03 .080 | 0,38-0,63 .015-.025 | 2,16 .085 |
| 3MN6 | Lower force | 15 Amps V | 1,95-3,1 7-11 | 1,11 4 | 1,52 .060 | 2,03 .080 | 0,38-0,63 .015-.025 | 2,16 .085 |

* $\pm 0,38$ mm
 $\pm .015$ in.

Dim. Dwg. Fig. 1

Standard
Basic Switches

MOUNTING DIMENSIONS (For reference only)

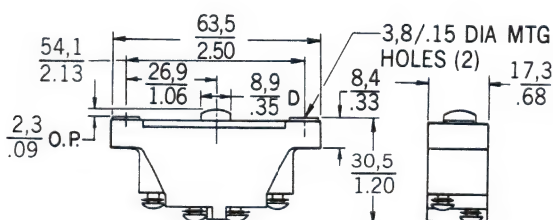


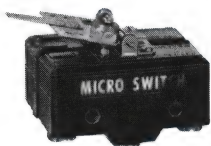
Fig. 1

Key: $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

Basic Switches

Tandem Switch Assemblies

6AS Series



FEATURES

- Variety of actuators
- Choice of circuitries and electrical ratings
- Choice of terminations
- Field adjustable operating point on one or both basic switches

GENERAL INFORMATION

6AS switches are two standard basic switches ganged together and actuated by a single actuator. Operating characteristics will depend on the type of individual switches and actuators.

ELECTRICAL RATING

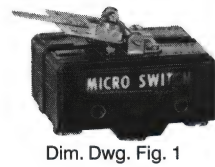
| Circuitry | Electrical Data and UL Codes |
|--|---|
| Single-pole double-throw unless otherwise noted in order guide | A 15 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L96 |
| Single-pole double-throw unless otherwise noted in order guide | G 20 amps, 125, 250 or 480 vac; 10 amps, 125 vac "L" (tungsten lamp load); 1 hp, 125 vac; 2 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L23 |

ORDER GUIDE

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pre-travel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

| Catalog Listing | Description | Lever Length mm inches | Type Terminals | Electrical Data and UL Codes | O.F. max. newtons ounces | R.F. min. newtons ounces | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|-----------------|--|------------------------------|-------------------|------------------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------|---------------------------|
| 6AS32 | Centered lever. Adjustment over both switches. | 58,72 2.312 | Solder | 15 Amps A | 2,22 8 | 0,14 0.5 | 0,51 .020 | 2,77 .109 | 18,29 .720 adj. |
| 6AS54 | Short lever. Adjustment over switch D. | 20,47 .806 | Solder | 15 Amps A | 3,34 12 | 0,83 3 | 0,25 .010 | 3,96 .156 | 18,24 .718 max. |
| 6AS25 | Centered lever. Adjustment over switch D. | 32,26 1.270 | A2 | 20 Amps G | 3,89 14 | 1,11 4 | 1,02 .040 | — | 18,67 .735 |

Unless otherwise noted * ±0,76 mm
±.030 in.



Dim. Dwg. Fig. 1

Basic Switches

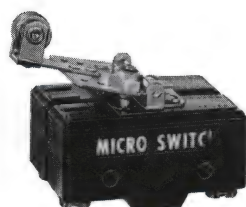
Tandem Switch Assemblies

6 AS Series

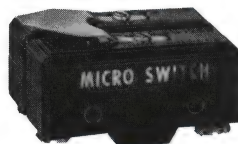
ORDER GUIDE

| Catalog Listing | Description | Lever Length mm Inches | Type Terminals | Electrical Data and UL Codes | O.F. max. newtons ounces | R.F. min. newtons ounces | O.T. min. mm Inches | D.T. max. mm Inches | O.P.* mm Inches |
|-----------------|---|------------------------------|-------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------|--------------------------|
| 6AS13 | Centered lever. Adjustment over switch D. | 30,56 1.203 | Solder | 15 Amps A | 2,22 8 | 0,14 0.5 | 0,51 .020 | 2,77 .109 | 29,77 1.172 |
| 6AS18 | Centered lever. Adjustment over both switches. | 30,56 1.203 | Solder | 15 Amps A | 2,22 8 | 0,14 0.5 | 0,51 .020 | 2,77 .109 | 29,77 1.172 adj. |
| 6AS36 | Lever over switch C. Adjustment over switch D. | 30,56 1.203 | A2 | 15 Amps A | 2,22 8 | 0,14 0.5 | 0,51 .020 | 2,77 .109 | 29,77 1.172 |
| 6AS35 | Lever and adjustment over switch D. | 30,56 1.203 | A2 | 15 Amps A | 2,22 8 | 0,14 0.5 | 0,51 .020 | 2,77 .109 | 29,77 1.172 |
| 6AS16 | Centered lever. Adjustment over switch D. | 30,56 1.203 | A2 | 20 Amps G | 3,89 14 | 1,11 4 | 1,02 .040 | 3,96 .156 | 30,96±1,14 1.219±.045 |
| 6AS69 | Centered lever. Adjustment over switch D. | 27,25 1.073 | T | 25 Amps M | — | — | — | — | 30,96±1,14 1.219±.045 |
| 6AS112 | Centered lever. Adjustment over switch D. | 30,56 1.203 | A2 | 25 Amps H | 3,89 14 | 1,11 4 | 1,02 .040 | 3,96 .156 | 30,96±1,14 1.219±.045 |
| 6AS5 | Centered leaf. No adjustment. Switches operate within .030" of each other. | 38,35 1.51 | A2 | 15 Amps A | — | — | 0,76-1,52 .030-.060 | — | — |

Unless otherwise noted * ±0,76 mm
±.030 in.



Dim. Dwg. Fig. 2



Dim. Dwg. Fig. 3

MOUNTING DIMENSIONS (For reference only)

STRAIGHT LEVER

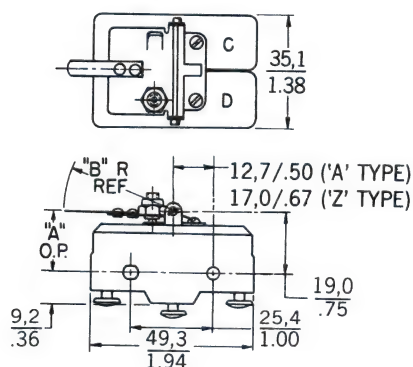


Fig. 1

ROLLER LEVER

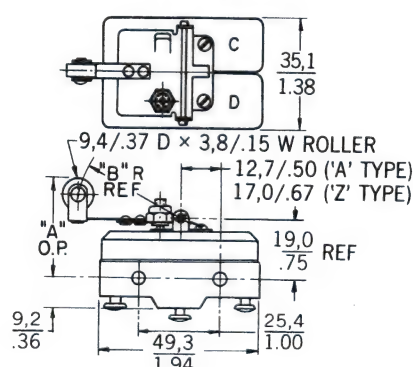


Fig. 2

LEAF

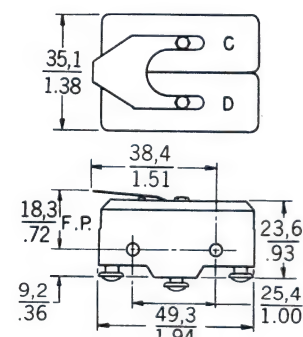


Fig. 3

Mounting holes accept pins or screws of
.139" (3,53 mm) diameter.

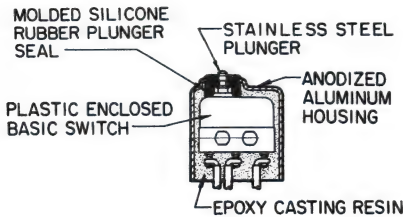
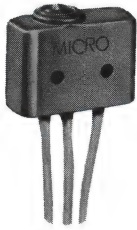
Key: 0,0 = mm
0.00 = inches

Standard
Basic Switches

Basic Switches

Environment Sealed

SE/XE Series



GENERAL INFORMATION

SE and XE switches are the smallest environment-sealed switches offered by MICRO SWITCH. Both types enclose basic switches within a corrosion resistant aluminum housing to seal precision switch contacts from contamination. SE switches include a SM basic switch, and XE switches include the smaller SX basic switch.

Switches held depressed for extended periods of time at temperature extremes may experience retarded plunger return upon deactuation. Where such a condition exists in the application, contact the 800 number for special designs that are available.

FEATURES

- Watertight seal per enclosure design symbol 3, MIL-S-8805
- Power load switching capability up to 7 amps
- Temperature tolerance up to +221°F (105°C)
- High temperature construction for use to +300°F (149°C)
- Several auxiliary actuators
- Choice of termination
- Military standard construction with listings qualified to MIL-S-8805
- All 4SE switches are UL recognized and CSA certified
- 4XE switches are UL recognized

ELECTRICAL RATINGS

| Circuitry | Electrical Rating Code | |
|--------------------------|---|---|
| Single-Pole Double-Throw | A 5 amps res., 3 amps ind., (sea level), 5 amps res., 2.5 amps ind., (50,000 feet) 28 vdc. 5 amps res., 5 amps ind., 125 or 250 vac, 60 Hz. | D UL Rating 7 amps, 250 vac 60 Hz |
| | B UL and CSA Rating 5 amps, 250 vac, 60 Hz | E 7 amps res., 4 amps ind., (sea level), 7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. |
| | C 7 amps res., 4 amps ind., (sea level), 7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. 7 amps res., 4 amps ind., (sea level), 115 vac, 400 Hz | R 1 amp res., 0.50 amp ind., 28 vdc. |

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position

SE SWITCHES ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Rating Code | Characteristics | | | | | |
|-----------------|--|------------------------|---------------------|--------------------------|---------------------|---------------------|---------------------|----------------|
| | | | O.F. Newtons ounces | R.F. min. Newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches |
| 1SE1 | Most applications | A | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 1SE2 | SPST — Normally-closed | A | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 1SE3 | SPST — Normally-open | A | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 4SE1 | UL and CSA listing and UL and CSA listed lead wire | B | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 5SE1 | Oil resistant Fluorosilicone seal | A | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 7SE1 | Lower force | A | 1,11-2,22 4-8 | 0,56 2 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 12SE4-T | High return force | A | 1,39-5,28 5-19 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |
| 1SE1-T | For customer leading | A | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,08 .003 | 0,1 .004 | 10,8 .425 |

1 foot leads
(other lengths available)



Fig. 1



Fig. 2

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position

AUXILIARY ACTUATORS FOR SE SWITCHES ORDER GUIDE

(Switches are not included with actuators)

| Catalog Listing | Description | Actuator Length A mm inches | Characteristics measured with actuators mounted to a 1SE1 | | | | | | |
|-----------------|---|-----------------------------------|---|--------------------------------|------------------------------|---------------------------|---------------------------|-----------------------|------------------------|
| | | | O.F. max. Newtons ounces | R.F. min. Newtons ounces | P.T. approx. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches | F.P. mm inches |
| JE-1 | Straight leaf (mounting hardware included) | 16,8 .66 | 3,34 12 | 0,56 2 | 3,81 .150 | 0,38 .015 | 0,64 .025 | 11,2 .440 | 15±0,76 .590±.030 |
| JE-4 | Roller leaf. Roller turned 90° to switch axis (mounting hardware included). | 16,8 .66 | 3,34 12 | 0,56 2 | 3,81 .150 | 0,38 .015 | 0,64 .025 | 16,3 .640 | 20,1 .790 approx. |
| JE-5 | Roller leaf (mounting hardware included) | 14,2 .560 | 3,34 12 | 0,56 2 | 3,81 .150 | 0,38 .015 | 0,64 .025 | 16,3 .640 | 20,1±0,76 .790±.030 |
| JE-17 | Roller leaf. Reversed position (mounting hardware included) | 14,2 .560 | 3,34 12 | 0,56 2 | 3,81 .150 | 0,38 .015 | 0,64 .025 | 16,3 .640 | 20,1±0,76 .790±.030 |
| JE-21 | Roller lever | 13,7 .540 | 1,67 6 | 0,28 1 | 2,54 .100 | 0,25 .010 | 0,41 .016 | 16,3 .640 | 18,8±0,76 .740±.030 |
| JE-22 | Tandem Roller Lever | 17,8 .700 | 4,73 17 | 1,11 4 | 2,54 .100 | 0,15 .006 | 0,3 .012 | 16,8±1,3 .660±.050 | 19,3±1,3 .760±.050 |

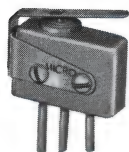


Fig. 3

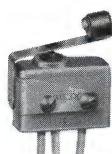


Fig. 4

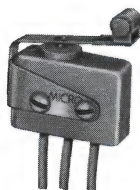


Fig. 5

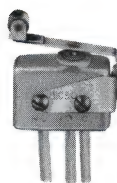


Fig. 6



Fig. 7

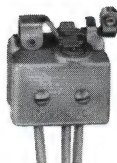


Fig. 8

Sealed/High
Temperature

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; D.T. — Differential Travel; O.P. — Operating Position.

XE SWITCHES ORDER GUIDE

1 foot leads
(other lengths
available)



Fig. 9



Fig. 10

| Catalog Listing | Recommended For | Electrical Rating Code | Characteristics | | | | | |
|-----------------------|---|------------------------|--------------------------------|--------------------------------|---------------------------|---------------------------|---------------------------|-----------------------------------|
| | | | O.F. max. Newtons ounces | R.F. max. Newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches ±.020 (0,51) |
| 1XE1 (MS27994-1) | Most applications MIL-S-8805 requirements | C | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |
| 1XE201 (MS27994-4) | General Use MIL-S-8805 requirements MIL-W-22759/11 wire | C | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |
| 1XE3 | SPST-Normally Open | C | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |
| 1XE301 (MS27994-5) | Gold Contacts MIL-W-22759/11 wire | R | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |
| 4XE1 | UL listing and UL and CSA listed leadwire | D | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |
| 5XE1 | Oil resistant Fluorosilicone seal | C | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |
| 14XE1 | Less operating force Use to +300°F (149°C) | E | 2,50 9 max. | 0,56 2 | 0,76 .030 | 0,1 .004 | 0,13 .005 | 10,9 .430 |
| 14XE1-T | For customer leading Use to +300°F (149°C) | E | 2,50 9 max. | 0,56 2 | 0,76 .030 | 0,1 .004 | 0,13 .005 | 10,9 .430 |
| 1XE1-T (MS27994-3) | For customer leading | C | 1,39-4,73 5-17 | 1,11 4 | 1,27 .050 | 0,1 .004 | 0,13 .005 | 10,8 .425 |

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position; F.P. — Free Position.

AUXILIARY ACTUATORS FOR XE SWITCHES ORDER GUIDE (Switches are not included with the actuators)



Fig. 11



Fig. 12

| Catalog Listing | Description | Characteristics measured with actuator mounted on a 1XE1 | | | | | | |
|-----------------|---------------|--|--------------------------------|------------------------------|---------------------------|---------------------------|------------------------|------------------------|
| | | O.F. max. Newtons ounces | R.F. min. Newtons ounces | P.T. approx. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches | F.P. mm inches |
| JM-1 | Straight leaf | 5,84 21 | 0,83 3 | 3,18 .125 | 0,23 .009 | 0,3 .012 | 10,8±0,76 .425±.030 | 14±0,76 .550±.030 |
| JM-5 | Roller leaf | 5,84 21 | 0,83 3 | 3,18 .125 | 0,23 .009 | 0,3 .012 | 15,9±0,89 .625±.035 | 19,1±0,89 .750±.035 |

Basic Switches

Environment Sealed

SE/XE Series

MOUNTING DIMENSIONS (For reference only)

SE ENVIRONMENT PROOF SWITCHES

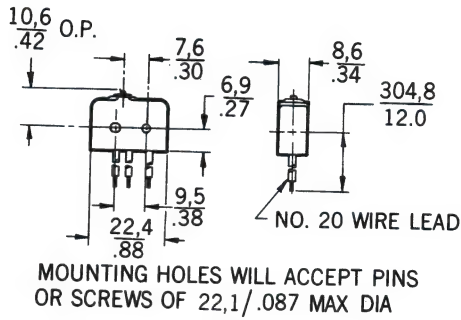


Fig. 1

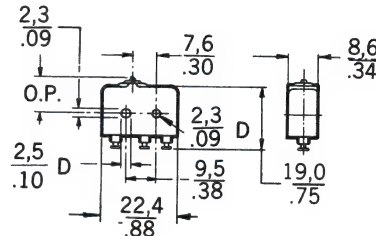


Fig. 2

XE ENVIRONMENT PROOF SWITCHES

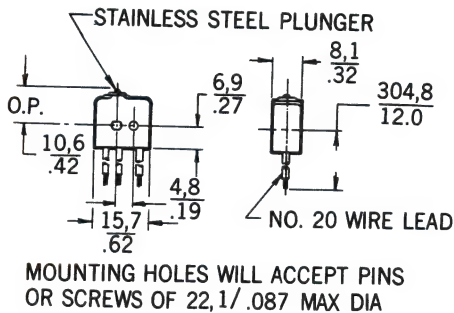


Fig. 9

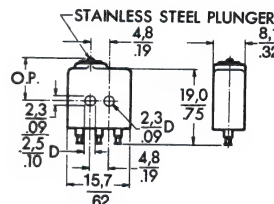


Fig. 10

Dimensions shown are for reference only. For actual dimensions, contact the 800 number.

AUXILIARY ACTUATORS

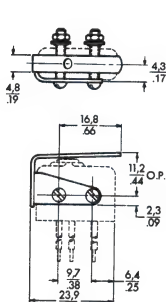


Fig. 3

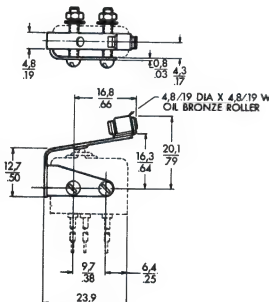


Fig. 4

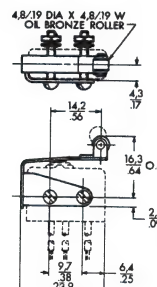


Fig. 5

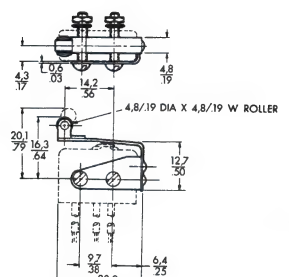


Fig. 6

Sealed/High Temperature

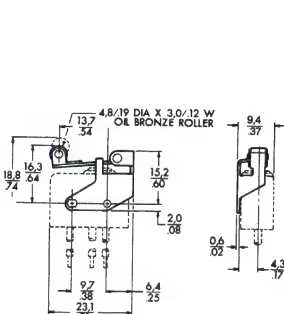


Fig. 7

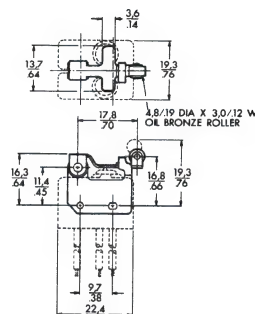


Fig. 8

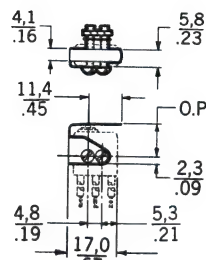


Fig. 11

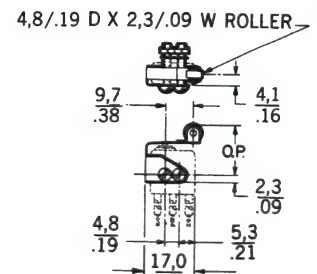


Fig. 12

Basic Switches

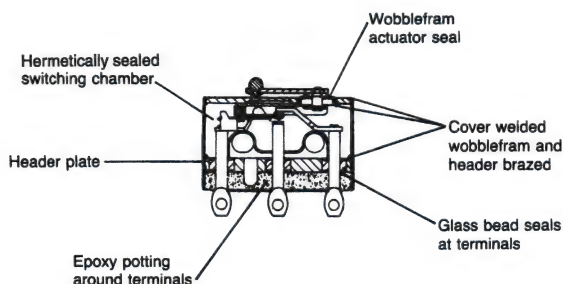
Hermetically Sealed

HM Series



GENERAL INFORMATION






HM switches are not generally recommended for 115 VAC, 60 Hz. If you have a 60 Hz application in the milliamp range, or applications that require the switch to function electrically during exposure to sub-freezing temperatures, contact the 800 number for special design variations that are available.



FEATURES

- Hermetically sealed per enclosure design symbol 5, MIL-S-8805
- Power load switching capability up to 4 amperes, 28 VDC and 115 VAC, 400 Hz
- Temperature tolerance from -85°F to +250°F (-65°C to +121°C)
- High temperature construction for use from -85°F to +500°F (-65°C to +260°C)
- Variety of auxiliary actuators
- Choice of terminal styles
- Gold contacts for special applications
- Military standard construction with listings on the MIL-S-8805 qualified products list.

ELECTRICAL RATINGS

| Circuitry | Electrical Rating Code |
|--|--|
| Single-Pole Double-Throw  | H 1 amp res., 0.25 amp ind., 28 vdc. |
| Single-Pole Double-Throw  | I 4 amps res., 2 amps ind., 0.5 amps lamp load, 115 vac, 400 Hz. 4 amps res., 2 amps ind., 1 amp lamp load, 28 vdc |
| Single-Pole Double-Throw  | J ½ amp res., ¼ amp ind. (sea level or 70,000 ft.), 28 vdc |
| Single-Pole Double-Throw  | K 3 amps res., 1 amp ind. (sea level or 70,000 ft.), 28 vdc 1 amp res. or ind. (sea level), 115 vac., 400 Hz. |
| Single-Pole Double-Throw  | L 3 amp res., 1 amp ind., 28 vdc 1 amp res., 1 amp ind., 115 vac, 400 Hz. |

APPLICATION NOTES

1. Honeywell MICRO SWITCH does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp. Catalog listings in the 5, 6, 15, and 16HM Series use silver cadmium oxide contacts. If you have specific questions, contact the MICRO SWITCH Application Center at 1-800-537-6945.
2. For applications involving non-arcing loads, catalog listings in the 9, 10, 19 and 20HM Series are recommended.
3. The 1, 2, 5, and 6HM Series are recommended for use only in 3 to 4 amp range applications.

Basic Switches

Hermetically Sealed

HM Series

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position.

ORDER GUIDE

| Catalog Listing | Recommended For | Electrical Rating Code | Operating Characteristics | | | | | |
|------------------------|--|------------------------|--------------------------------|--------------------------------|---------------------------|---------------------------|---------------------------|---|
| | | | O.F. max. Newtons ounces | R.F. min. Newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches ±.015 (0,38 mm) |
| 11HM1 (MS27216-5) | Most applications. Exceeds MIL-S-8805 requirements for shock and vibration. | K | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 13HM1 | Applications requiring gold contacts | H | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 15HM1 | Operating in temperatures to 300°F (149°C) | L | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 9HM1 (MS27216-6) | Bifurcated gold contacts | J | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 2HM19-1 (MS27216-2) | MIL-S-8805 application requirements 1 ft. (305mm) leads | I | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 2HM19-5 (MS27216-4) | 5 foot (1524mm) long leads | I | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 16HM1-1 | High temperature to 500°F (260°C) flat spring | L | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |
| 15HM2 | Operating in temperatures to +500°F (260°C) with weld tab termination. No potting. | L | 1,95 7 | 0,28 1 | 0,76 .030 | 0,08 .003 | 0,15 .006 | 8,38 .330 |



Fig. 1

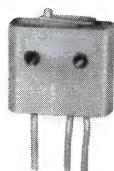


Fig. 2

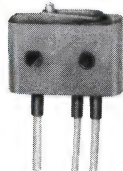


Fig. 3

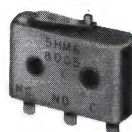


Fig. 4

HM MOUNTING

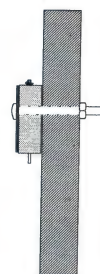
A force spreading plate is recommended to reduce the chance of product damage due to excessive mounting force.

MOUNTING PLATE

19PA137-HM

NOTE

Torque on #2 mounting screws must be restricted to 1.5 inch pounds max. to prevent switch damage. The force spreading mounting plate used as shown will allow up to 2.5 inch pounds of mounting torque.



Sealed/High Temperature

Basic Switches

Hermetically Sealed

HM Series

Characteristics: O.F. — Operating Force; R.F. — Release Force;
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;
O.P. — Operating Position; F.P. — Free Position.

AUXILIARY ACTUATORS FOR HM SWITCHES ORDER GUIDE (Switches are not included)

| Catalog Listing | Description | Temp. (Max.) | Operating Characteristics with Actuator Mounted on a 6HM1-1 | | | | | | |
|-----------------|----------------|------------------|---|--------------------------------|---------------------------|---------------------------|---------------------------|----------------------|----------------------|
| | | | O.F. max. Newtons ounces | R.F. min. Newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P. mm inches | F.P. mm inches |
| JS-254 | Leaf | 500°F (260°C) | 2,50 9 | 0,56 2 | — | 0,76 .030 | 0,76 .030 | 8,64 .340 approx. | 12,2 .480 approx. |
| JS-151 | Roller leaf | 500°F (260°C) | 2,50 9 | 0,56 2 | — | 0,76 .030 | 0,76 .030 | 14 .550 approx. | 17,5 .690 approx. |
| JS-307 | Straight lever | 500°F (260°C) | 0,42 1.5 | 0,03 .11 | 3,18 .125 approx. | 0,64 .025 | 1,42 .056 | 10,3 .406 approx. | |
| JS-308 | Roller lever | 500°F (260°C) | 0,42 1.5 | 0,03 .11 | 3,18 .125 approx. | 0,64 .025 | 1,42 .056 | 14,3 .562 approx. | |



Fig. 5



Fig. 6

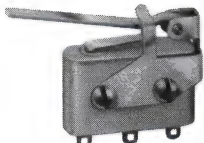


Fig. 7

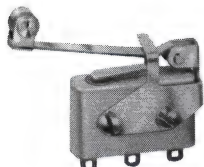


Fig. 8

MOUNTING TORQUE:

JS-254 2.5 inch pounds
all others 1.5 inch pounds
See optional mounting plate – previous page.

All standard JS actuators in the SM Section of Catalog 10 can be used with the HM line. However, hardware, insulator, and oil impregnated roller supplied with these actuators may not provide the required service at temperatures above 250°F (121°C).

Basic Switches

Hermetically Sealed

HM Series

MOUNTING DIMENSIONS (For reference only)

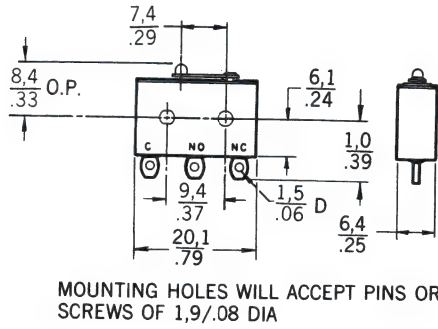


Fig. 1

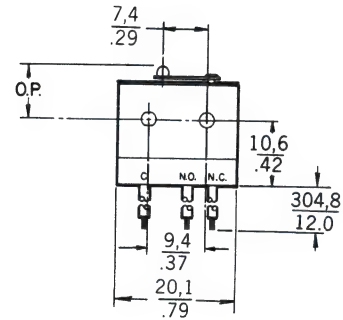


Fig. 2

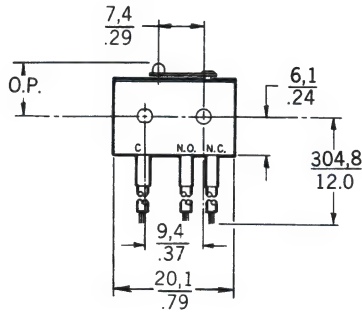


Fig. 3

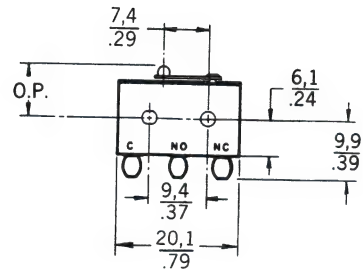


Fig. 4

AUXILIARY ACTUATORS

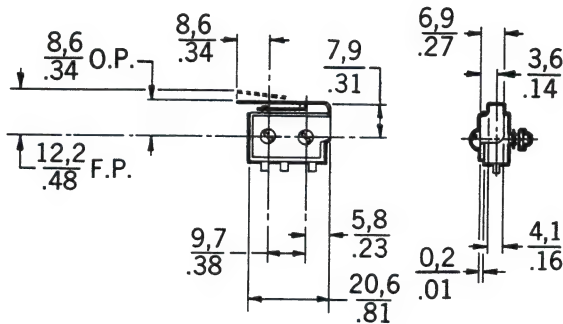


Fig. 5

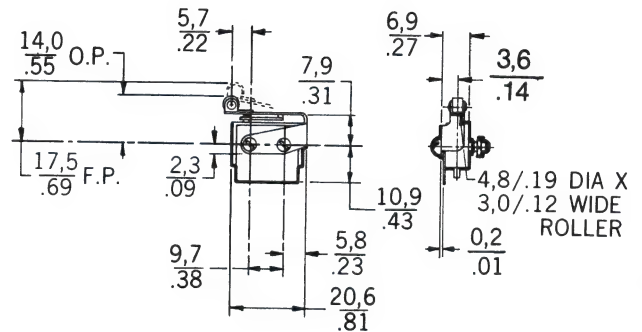


Fig. 6

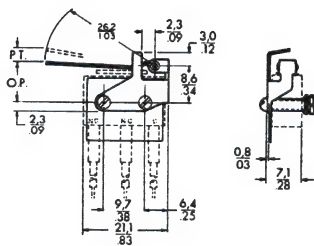


Fig. 7

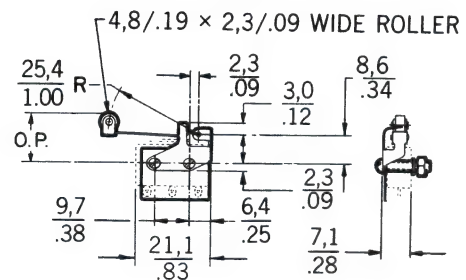


Fig. 8

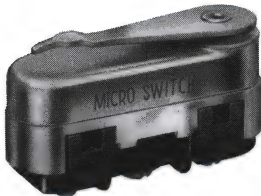
Key: 0.0 = mm
0.00 = inches

Sealed/High
Temperature

Basic Switches

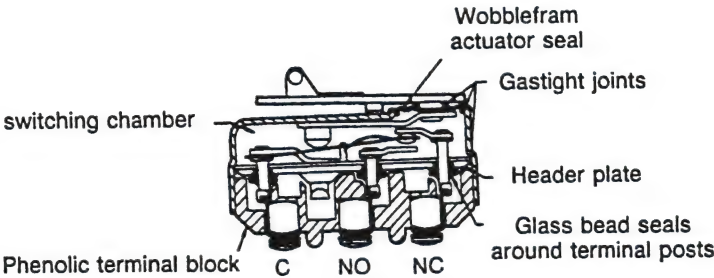
Hermetically Sealed

HS Series



GENERAL INFORMATION

HS switches are designed for applications where maximum electrical rating and maximum sealing are essential, and where size and weight requirements are less critical. These switches are side mounted through mounting holes that are outside the sealed switching chamber.



FEATURES

- Hermetically sealed per MIL-S-8805, design symbol 5 (–67° to +180°F or –55° to 82°C)
- Power load switching capability up to 25 amperes, 28 VDC or 1 amp 115 VAC 60 Hz
- Temperature tolerance from –67°F to +250°F (–55°C to +125°C)
- High temperature construction for use to +300°F (149°C)
- Several styles of integral lever actuators
- Two styles of terminals
- Military standard construction with listings on the MIL-S-8805 qualified products list
- UL recognized File #E12252; CSA certified LR 4442

ELECTRICAL RATINGS

| Circuitry | Electrical Rating Codes |
|-----------------------------|--|
| Single-Pole Double-Throw | M 25 amps res., 10 amps ind., 5 amps motor, 3 amps lamp load, 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz UL-CSA Rating: 1 amp., 115 vac, 60 Hz. |
| | N 15 amps res., 10 amps ind., 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz |
| | O 20 amps res., 10 amps ind., 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz UL-CSA Rating: 1 amp, 115 vac, 60 Hz |
| | P 10 amps res., 5 amps ind., 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz UL-CSA Rating: 1 amp., 115 vac, 60 Hz. |

Basic Switches

Hermetically Sealed

HS Series

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

ORDER GUIDE



Dim. Dwg. Fig. 1

| Catalog Listing | Recommended For | Electrical Rating Code | O.F. max. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | D.T. max. mm inches | O.P.* mm inches |
|-----------------------------|---|------------------------|--------------------------------|--------------------------------|---------------------------|---------------------------|---------------------------|-----------------------|
| 1HS1 (MS25011-1) | Most applications. MIL-S-8805 (M8805/47) | 1 Amp M | 2,78-6,12 10-22 | 1,11 4 | 1,65 .065 | 0,25 .010 | 0,51 .020 | 13,5 .530 |
| 101HS1 | Operating in temperature to +250°F (121°C) | 1 Amp O | 2,78-6,12 10-22 | 1,11 4 | 1,65 .065 | 0,25 .010 | 0,51 .020 | 13,5 .530 |
| 102HS1 | Operating in temperature to +300°F (149°C) | 1 Amp P | 2,78-8,34 10-30 | 1,11 4 | 1,65 .065 | 0,25 .010 | 0,51 .020 | 13,5 .530 |



Dim. Dwg. Fig. 2

| | | | | | | | | |
|-----------------|-----------------------|-------------------|---------------------------|------------------|---------------------|---------------------|---------------------|----------------------------|
| 4HS4-118 | Lead wire termination | 1 Amp N | 2,78-6,12 10-22 | 1,11 4 | 1,65 .065 | 0,25 .010 | 0,51 .020 | 15,6 .615 = .020 |
|-----------------|-----------------------|-------------------|---------------------------|------------------|---------------------|---------------------|---------------------|----------------------------|



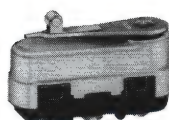
Dim. Dwg. Fig. 3

| | | | | | | | | |
|--------------|--|-------------------|--------------------------|------------------|---|--------------------------|---------------------|------------------------------|
| 1HS41 | Applications requiring added overtravel | 1 Amp M | 1,11-5,56 4-20 | 0,56 2 | — | 1,57 .062 max. | 2,54 .100 | 13,54 .533 approx. |
|--------------|--|-------------------|--------------------------|------------------|---|--------------------------|---------------------|------------------------------|



Dim. Dwg. Fig. 4

| | | | | | | | | |
|-----------------------------|---|-------------------|---------------------------|------------------|---------------------|---------------------|---------------------|---------------------|
| 1HS6 (MS25011-2) | MIL-S-8805 requirements More operating force | 1 Amp M | 6,12-7,78 22-28 | 1,11 4 | 2,16 .085 | 0,25 .010 | 0,51 .020 | 13,5 .530 |
|-----------------------------|---|-------------------|---------------------------|------------------|---------------------|---------------------|---------------------|---------------------|



Dim. Dwg. Fig. 5

| | | | | | | | | |
|-------------|--------------|-------------------|---------------------------|------------------|---------------------|---------------------|---------------------|---------------------|
| 1HS3 | Roller lever | 1 Amp M | 2,78-6,12 10-22 | 1,11 4 | 1,65 .065 | 0,25 .010 | 0,51 .020 | 18,3 .720 |
|-------------|--------------|-------------------|---------------------------|------------------|---------------------|---------------------|---------------------|---------------------|

Except where stated* $\pm 0,38\text{mm}$
 $\pm .015\text{ in.}$

Sealed/High
Temperature

Basic Switches

Hermetically Sealed

HS Series

MOUNTING DIMENSIONS (For reference only)

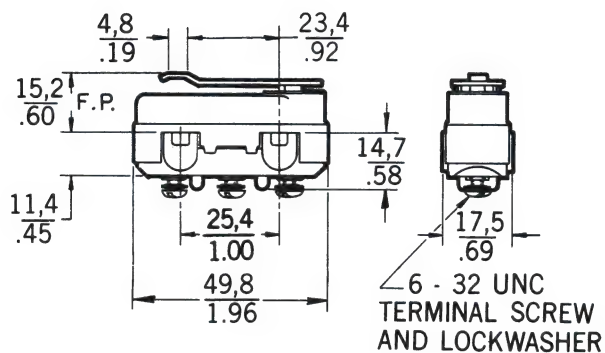


Fig. 1

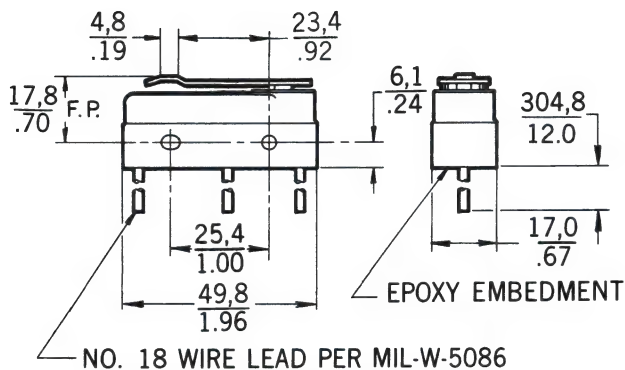


Fig. 2

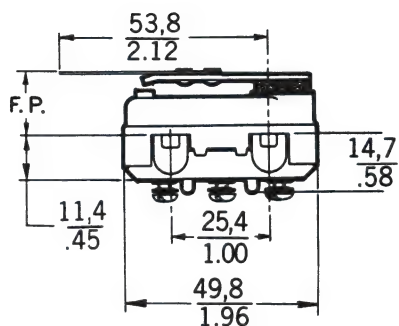


Fig. 3

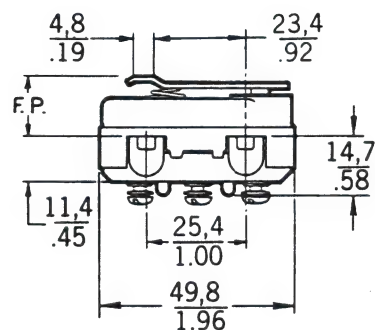


Fig. 4

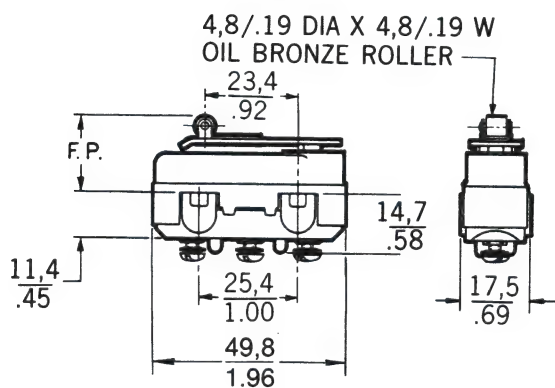


Fig. 5

Fig. 5

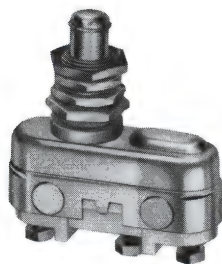
Mounting holes will accept pins or screws of .139" (3.53 mm) dia.

Key: $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

Basic Switches

High Temperature

HT Series




FEATURES

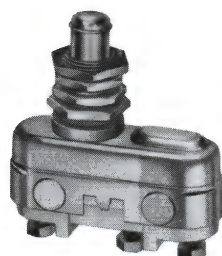
- Temperature tolerance up to +1000°F (538°C)
- Designed to meet military applications
- Side and panel mount
- UL recognized file # E12252

GENERAL INFORMATION

HT switches will withstand temperatures up to +1000°F. The switching element is mounted on a ceramic base within a stainless steel enclosure. HT switches are not classified as sealed switches.

ELECTRICAL CHARACTERISTICS

| Circuitry | Electrical Data |
|-----------------------------|--|
| Single-Pole Double-Throw |  UL Ratings: 3 amps, 1/10 HP, 125 vac. 3 amps, 1/6 HP, 250 vac. |

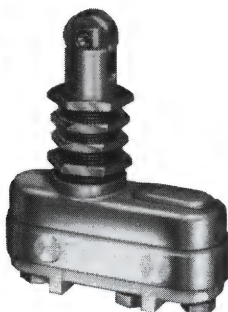


Dim. Dwg. Fig. 1

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; O.P. — Operating Position.

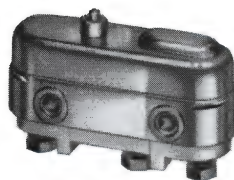
ORDER GUIDE

| Catalog Listing | Description | Electrical Rating | O.F. newtons ounces | R.F. min. newtons ounces | P.T. max. mm inches | O.T. min. mm inches | O.P. mm inches |
|-----------------|------------------------------|-------------------|------------------------|-----------------------------|------------------------|------------------------|-------------------------|
| 1HT1 | Straight plunger panel mount | 3 Amps | 2,78-5,56 10-20 | 1,67 6 | 1,65 .065 | 4,78 .188 | 23,7 .935 approx. |



Dim. Dwg. Fig. 2

| | | | | | | | |
|------|----------------------------|--------|-----------------|-----------|--------------|--------------|--------------------------|
| 3HT1 | Roller plunger panel mount | 3 Amps | 8,34 30 max. | 1,67 6 | 1,65 .065 | 4,78 .188 | 35,9 1,413 approx. |
|------|----------------------------|--------|-----------------|-----------|--------------|--------------|--------------------------|



Dim. Dwg. Fig. 3

| | | | | | | | |
|------|------------------------|--------|--------------------|-----------|--------------|--------------|------------------------|
| 2HT1 | Pin plunger side mount | 3 Amps | 2,78-5,56 10-20 | 1,67 6 | 1,27 .050 | 0,25 .010 | 16,8 .66 approx. |
|------|------------------------|--------|--------------------|-----------|--------------|--------------|------------------------|

Sealed/High
Temperature

Basic Switches

High Temperature

HT Series

MOUNTING DIMENSIONS (For reference only)

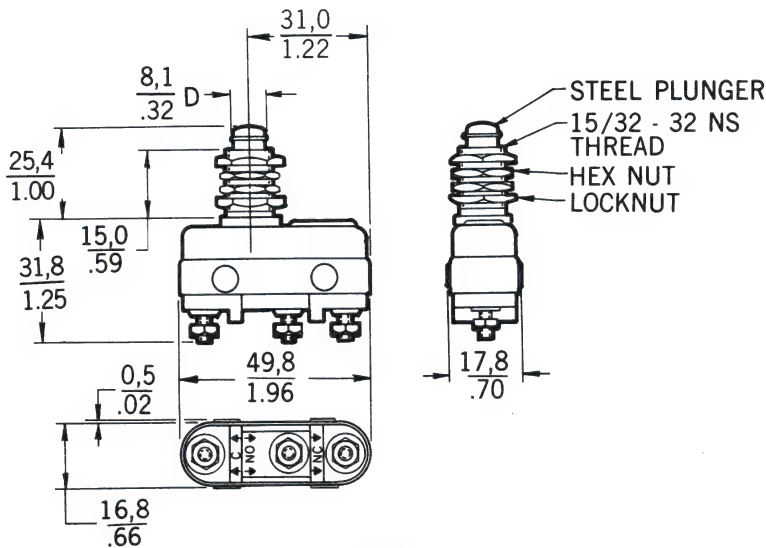


Fig. 1

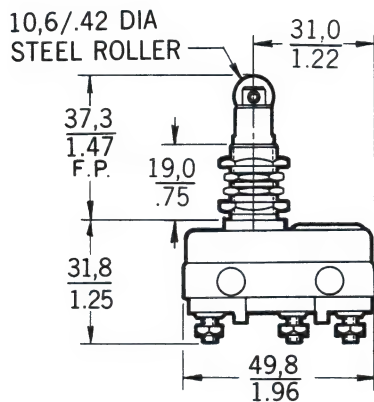
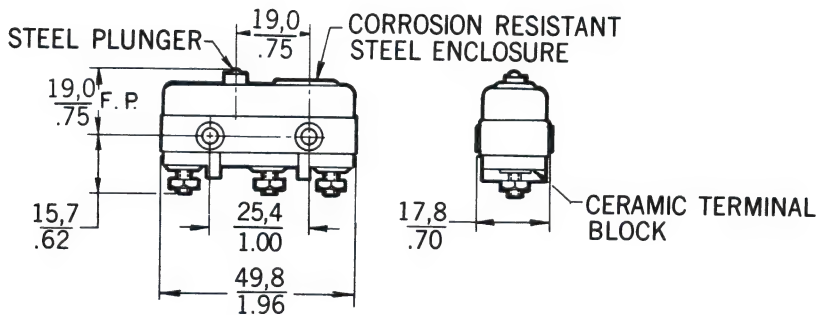


Fig. 2



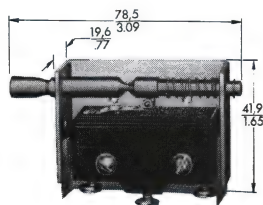
MOUNTING HOLE WILL ACCEPT PINS OR SCREWS OF 3,6/.14 DIA.

Fig. 3

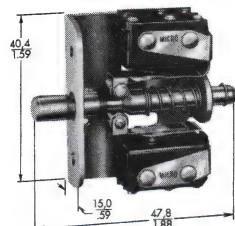
Mounting holes will accept pins or screws of .139" (3,53 mm) dia.

Key: 0,0 = mm
0.00 = inches

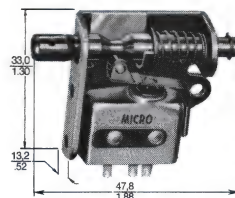
Style 1



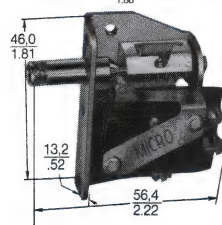
Style 2



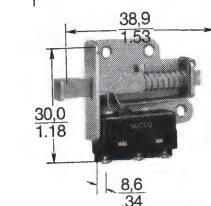
Style 3



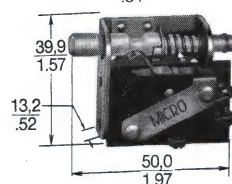
Style 4



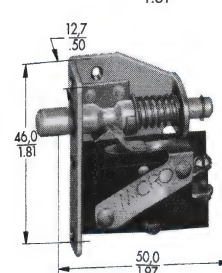
Style 5



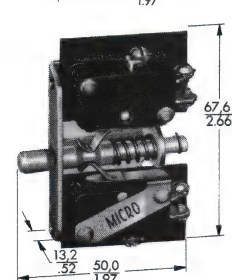
Style 6



Style 7



Style 8



FEATURES

- Automatically cut power when service door or drawer is opened, helping protect personnel and equipment.
- Enables circuit testing with power On by manually pulling rod actuator to maintained-On position. (Closing door or drawer resets switch.)
- Basic switches are component recognized by UL to UL1054 special use switches.
- UL recognized AC are available

ELECTRICAL RATINGS

| | |
|---|--|
| A | 15 amps, 125, 250 or 480 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC. |
| B | 5 amps, 125 or 250 VAC; 30 VDC ind., 3 amps (sea level) and 2.5 amps (50,000 ft.); res., 5 amps (sea level and 50,000 ft.); max. inrush 25 amps. |
| C | 15 amps, 125 or 250 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 1/3 hp, 125 or 250 VAC. |

Characteristics:

F.P. — Free Position;

O.P. — Operating Position;

D.P. — Depressed Position.

ORDER GUIDES WITH STEEL ROD ACTUATORS

| Style No. | Description | Basic Switch | Elec. Rating | Catalog Listing | F.P. max. mm In. | O.P. min. mm In. | D.P. max. mm In. | Temp. Ratings |
|-----------|--|--------------|--------------|-------------------------------------|------------------|------------------|------------------|------------------------------------|
| 1 | 15 amps, SPDT. | BZ | A | 1AC2 | 11,1 .438 | 6,35 .250 | 3,18 .125 | -65°F to +180°F |
| 2 | 5 amps, Four SPDT ckt. | SM(4) | B | 8AC1 | 9,53 .375 | 5,16 .203 | 3,18 .125 | -65°F to +250°F |
| 3 | Three 6-foot leads. Sealed basic switches. 5 amps, SPDT | SE | B | 9AC4 | 9,53 .375 | 5,16 .203 | 3,18 .125 | -65°F to +221°F |
| 3 | Two 3-foot leads. Sealed basic switches. 5 amps, SPST-N.O. | SE | B | 9AC12-3 | 9,53 .375 | 5,16 .203 | 3,18 .125 | -65°F to +221°F |
| 4 | Can be reset without momentary ckt. break. 15 amps, SPDT. | V3 | C | 13AC1 | 15,9 .625 | 12,3 .485 | 6,68 .263 | -67°F to +300°F |
| 5 | Miniature size. 5 amps, SPDT | SM | B | 17AC1-T 17AC18-T† (MS16106-4) | 9,53 .375 | 5,59 .220 | 4,45 .175 | -65°F to +250°F -67°F to +185°F |
| 6 | Tapped hole in end of actuator rod. 15 amps, SPDT. | V3 | C | 2AC59† (MS16106-1) | 9,53 .375 | 5,16 .203 | 3,18 .125 | -67°F to +185°F |

†—These are military approved listings and the temperature range shown is for the finished product. All other listings are not military approved and the temperature range shown is the range for the basic switch only.

WITH HIGH STRENGTH THERMOPLASTIC ROD ACTUATORS*

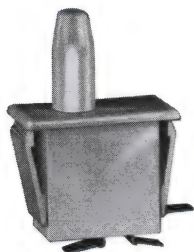
| | | | | | | | |
|---|--|-------|---|---|--------------|--------------|--------------|
| 2 | 5 amps. Four SPDT ckt. | SM(4) | B | 8AC9 (MS16106-3) | 9,53 .375 | 5,16 .203 | 3,18 .125 |
| 6 | 15 amps. SPDT. | V3 | C | 22AC1 | 9,53 .375 | 5,16 .203 | 3,18 .125 |
| 6 | Tapped hole in end of actuator rod. 15 amps. SPDT. | V3 | C | 22AC2 | 9,53 .375 | 5,16 .203 | 3,18 .125 |
| 7 | 15 amps. SPDT. | V3 | C | 23AC1 | 9,53 .375 | 5,16 .203 | 3,18 .125 |
| 7 | Tapped hole in end of actuator rod. 15 amps. SPDT. | V3 | C | 23AC2 | 9,53 .375 | 5,16 .203 | 3,18 .125 |
| 8 | 15 amps. Two SPDT ckt. | V3(2) | C | 24AC1 | 9,53 .375 | 4,75 .187 | 3,18 .125 |
| 8 | Tapped hole in end of actuator rod. 15 amps. Two SPDT ckt. | V3(2) | C | 24AC2 4AC54** (MS16106-2) 4AC55 (MS16106-5) | 9,53 .375 | 4,75 .187 | 3,18 .125 |

*Not for use above 85°C (+185°F). Use steel actuators at higher temperatures. For additional catalog listings, contact the 800 number.

**Both switches operate on pull stroke, only one switch operates on push (reset) stroke.

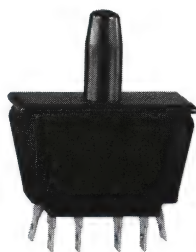
Snap-in Panel Mount

Momentary Action



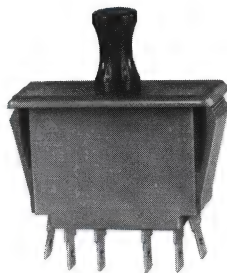
Bullet nose plunger
(SPDT shown)

Alternate Action



Bullet nose plunger
(DPDT shown)

Push-Pull

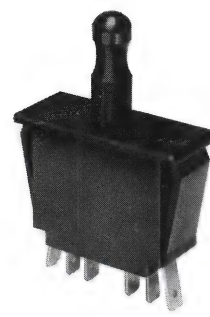


Finger grip plunger
(DPDT shown)

Pull-to-Cheat



Finger grip plunger
with flat tip (SPDT shown)



Finger grip plunger with
spherical tip (DPDT
shown)

FEATURES

- Attractive, rugged snap-in panel mount design — easy installation
- Choice of momentary, alternate push-pull and pull-to-cheat operation
- Quick-connect terminals
- Expected mechanical life: 1 million operations, 95% survival
- Temperature range: -35° to $+180^{\circ}\text{F}$ (-37° to 82°C)
- UL recognized file #E22779, CSA certified file #LR4442

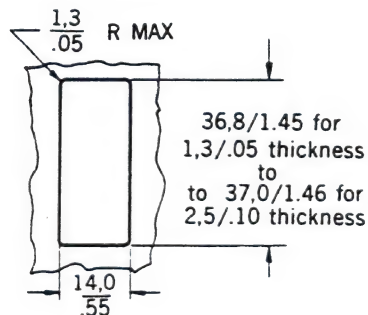
DM electrical rating — UL and CSA rating:
10 amps, 1/2 HP, 125, 250 or 277 VAC

DP electrical rating — UL standard 508,
14 amps 3/4 hp, 125, 250 VAC; Pilot Duty:
150 V A — 125, 250 VAC; 16 amps, 125,
250, 277 VAC, 3/4 hp, 125, 250 VAC; Pilot
Duty: 150 V A — 125, 250 VAC.

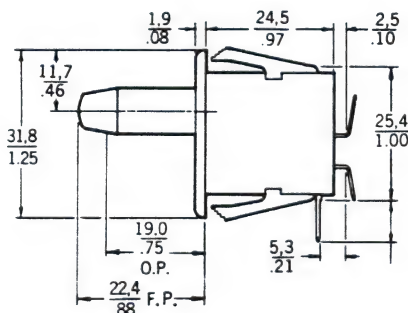
NOTE: Refer to MICRO SWITCH Catalog 30 for DM switches with snap-on pushbuttons.

MOUNTING DIMENSIONS

Dimensions shown are for reference only.



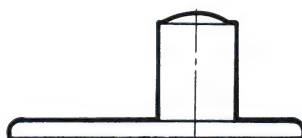
2DM
Panel Hole Detail



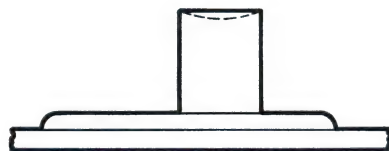
1DM/1DP
Panel Hole Detail

MOMENTARY ACTION

Momentary action switches are available in a choice of concave, convex, or bullet nose plunger styles.



Convex
plunger



Concave
plunger

ALTERNATE ACTION

These switches have push-on, push-off operation. The alternate action is at two levels, with the maintained On position of the plunger at a lower level than the normal Off.

PUSH-PULL

When plunger is depressed, it remains down and maintains circuit transfer. Switch contacts return to the previous position when the plunger is pulled to the extended position.

PULL-TO-CHEAT

Pull-to-cheat operates normally as a momentary action switch. However, by pulling the plunger beyond the normal free position, a maintained On position is achieved.

POSSIBLE VARIATIONS

In addition to the standard quick-connect .188 x .020" (4,78 x 0,51 mm) terminals, angled forms and .250 x .032" (6,35 x 0,81 mm) terminals can be provided. DM plungers and faceplates are available in any combination of white, black, gray, or red.

Basic Switches

Snap-in Panel Mount

DM/DP Series

Characteristics: F.P. — Free Position; O.P. — Operating Position; O.T. — Overtravel; O.F. — Operating Force; R.F. — Release Force

ORDER GUIDE – DM

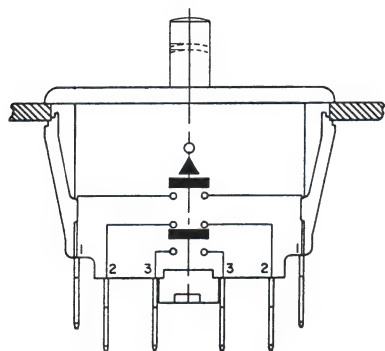
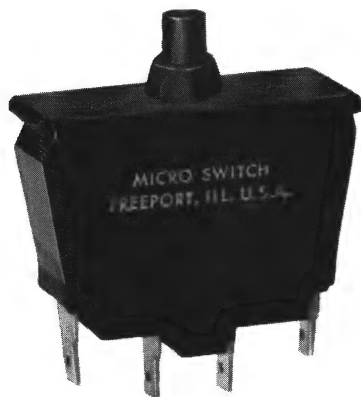
| Catalog Listing | Action | Circuitry | Plunger Type/Color | Faceplate Color | F.P. mm in. | O.P. mm in. | O.T. max. mm in. | O.F. max. N oz. | R.F. min. N oz. |
|-----------------|---------------|-----------|--------------------|-----------------|--------------|-----------------------|------------------|-----------------|-----------------|
| 1DM1 | Momentary | SPDT | Bullet nose/White | White | 22,4 .880 | 19,1±1,5 .750±.060 | 9,53 .375 | 4,17 15 | 0,83 3 |
| 1DM2 | Momentary | SPNC | Bullet nose/White | White | 22,4 .880 | 19,1±1,5 .750±.060 | 9,53 .375 | 4,17 15 | 0,83 3 |
| 1DM3 | Momentary | SPNO | Bullet nose/White | White | 22,4 .880 | 19,1±1,5 .750±.060 | 9,53 .375 | 4,17 15 | 0,83 3 |
| 1DM18 | Momentary | SPDT | Concave/Black | Gray | 11,4 .450 | — | 3,05 .120 | 4,17 15 | 0,83 3 |
| 1DM19 | Momentary | SPDT | Concave/Red | Gray | 11,4 .450 | — | 3,05 .120 | 4,17 15 | 0,83 3 |
| 1DM21 | Momentary | SPDT | Convex/White | White | 11,4 .450 | 9,02±1,5 .355±.060 | 3,05 .120 | 4,17 15 | 0,83 3 |
| 1DM38 | Momentary | SPNO | Convex/White | White | 11,4 .450 | 9,02±1,5 .355±.060 | 3,05 .120 | 4,17 15 | 0,83 3 |
| 1DM301 | Push-Pull | SPDT | Finger grip/Black | Gray | 24,1 .950 | — | 15,9 .625 | — | — |
| 1DM401** | Pull-to-Cheat | SPDT | Finger grip/White | White | 17,8 .700 | — | 13,2 .520 | 4,17 15 | 0,83 3 |
| 2DM1 | Momentary | DPDT | Bullet nose/Black | Black | 22,4 .880 | 19,6±1,0 .770±.040 | 10,2 .400 | 6,67 24 | 1,67 6 |
| 2DM5 | Momentary | DPDT | Concave/Black | Gray | 11,4 .450 | — | 3,05 .120 | 6,67 24 | 1,67 6 |
| 2DM6 | Momentary | DPDT | Concave/Red | Gray | 11,4 .450 | — | 3,05 .120 | 6,67 24 | 1,67 6 |
| 2DM301 | Push-Pull | DPDT | Finger grip/Black | Gray | 24,1 .950 | — | 15,9 .625 | — | — |
| 2DM409 | Pull-to-Cheat | DPDT | Finger grip/Black | Black | 21,6 .850 | 18,9±1,3 .745±.050 | 15,0 .590 | 6,67 24 | — |
| 2001DM1* | Alternate | SPDT | Bullet nose/White | White | 22,4 .880 | — | 15,4 .605 | 5,56 20 | — |

* Latch position 16,9 mm ± 0,76 mm (.665 in. ± .030 in.)

** Extended position 23,6 mm (.930 in. max.)

ORDER GUIDE – DP

| Catalog Listing | Action | Circuitry | Plunger Type/Color | Faceplate Color | F.P. mm in. | O.P. mm in. | O.T. max. mm in. | O.F. max. N oz. | R.F. min. N oz. |
|-----------------|-----------|-----------|--------------------|-----------------|--------------|-----------------------|------------------|-----------------|-----------------|
| 1DP5 | Momentary | SPNO | Bullet nose/White | White | 22,4 .880 | 15,1±1,5 .595±.060 | 9,53 .375 | 4,45 16 | 0,83 3 |
| 1DP801 | Momentary | SPDT | Concave/White | White | 11,4 .45 | 9,0±1,5 .355±.060 | 3,0 .120 | 6,67 24 | 0,83 3 |



WWs are available with or without a plunger guard. A cheat-key can be furnished for use with the plunger guard to maintain the switch plunger in the depressed condition (see photos →).

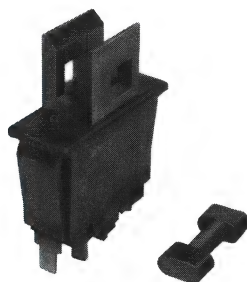
GENERAL INFORMATION

The WW Series switching mechanism is a non-snap double break shorting bar type construction. One, two or three circuit versions are available.

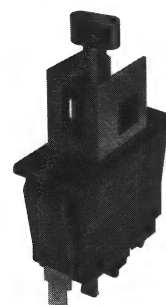
The three-circuit unit has two poles. The term "pole" denotes the number of completely separate circuits that can pass through the switch at one time. On a three-circuit switch in the unoperated condition (see drawing) circuit #2 is closed and circuit #1 and #3 are open. As the plunger is depressed, circuit #2 opens and circuit #1 and #3 are closed. The switch is two-pole since it makes and breaks two separate circuits (#1 and #3). When the plunger is released, circuit #1 and #3 are broken and circuit #2 is closed.

FEATURES

- Snap-in panel mounting
- Variety of terminal sizes
- Accepts quick-connect insulated terminals
- 10-16 amps electrical rating at 125 or 250 VAC depending on number of circuits and termination
- Same panel cutout as double-pole DM switch
- Quick-connect D7 and D9 termination complies with VDE requirements for 3mm air gap
- Switches with plunger guards and D7, D9 terminations are VDE approved
- UL recognized, CSA certified
- Meets UL's 100,000 operations requirement for operator-accessible interlock switches
- Covered under UL standard 508 Industrial Motor Controls

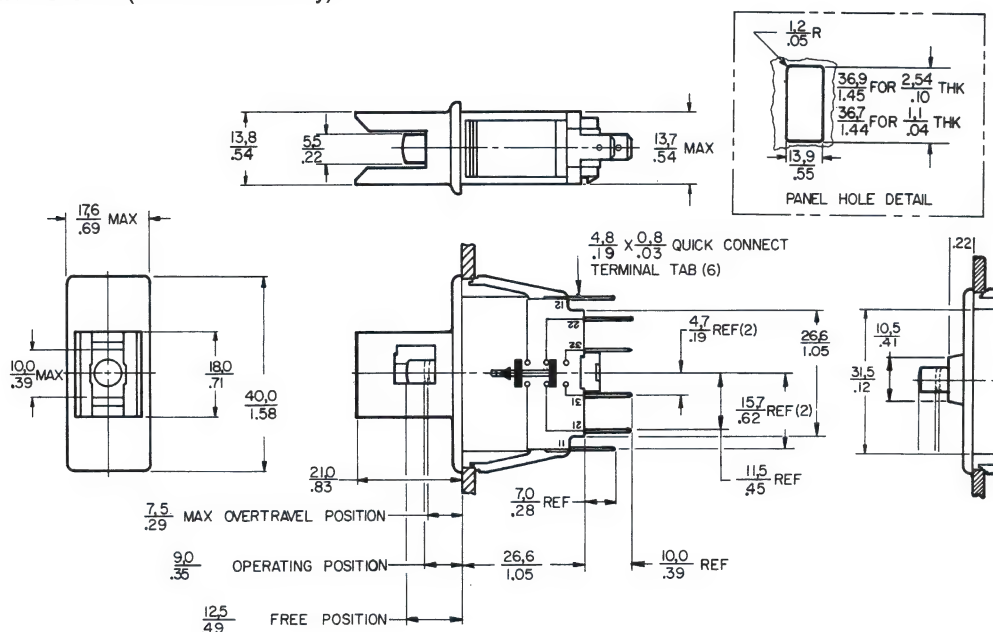


Plunger guard version and cheat-key.



With cheat-key installed.

MOUNTING DIMENSIONS (For reference only)



NOTE: Terminals will accept quick-connect receptacles available from AMP, Hollingsworth and others.

ELECTRICAL RATINGS

UL and CSA * Asterisked loads tested for 100,000 cycles

| Electrical Rating | 3-Pole | Electrical Rating | 2-Pole | Electrical Rating | 1-Pole |
|-------------------|--|-------------------|---|-------------------|--|
| C | Contacts 1-1, 3-3: †*15A, 125VAC, *10A, 250VAC: ½ hp @ 125, 250VAC; 3A "L", 125VAC; 150VA pilot duty @ 125/250VAC | A | Contacts 1-1, 3-3: †*16A, 125/250VAC: ½ hp, 125/250 VAC; 3A "L", 125VAC; 150 VA pilot duty 125/250 VAC; *2A, 24VDC | B | Contacts 1-1: *16A, 125/250VAC; ¾ hp, 125/250VAC; 150VA pilot duty 125/250 VAC; 3A, "L", 125VAC |
| D | Same as C with 0.1A, 125 VAC; *2A, 24VDC | F | Same as A with 0.1A, 125VAC | | |
| E | †Contacts 2-2: 0.1A, 125VAC/VDC | G | *5A, 125VAC, 2A, *24VDC | | |

VDE †

Flagged loads tested for 10,000 cycles

| |
|--|
| Circuits #1 and #3 †16 (4)A, 250VAC |
| Circuit #2 †0.1 (0.05) A, 250VAC |

ORDER GUIDE

| Catalog Listings* | Circuitry | Electrical Rating | Plunger Guard |
|-------------------|-----------------------------|-------------------|---------------|
| WW1A04A-D7 | #1 - N.O. | A | No |
| WW1G03A-D7 | #1 & #3 - N.O. | A | No |
| WW1K06D-D7 | #1 & #3 - N.O. #2 - N.C. | C E | No |
| WW1G02A-D9 | #1 & #3 - N.O. | A | Yes |
| WW1K05D-D9 | #1 & #3 - N.O. #2 - N.C. | C E | Yes |

Cheat-key: Catalog Listing **15PA256-WW**

Termination Options

To order other termination options, substitute the option letter and number at the end of the catalog listing.

D7: .187 x .032 in. (4,75 x 0,8 mm).

D8: .187 x .020 in. (4,75 x 0,5 mm).

D9: .250 x .032 in. (6,35 x 0,8 mm).

D7 and D9 terminals are VDE certified.

VDE limits D7 terminals to 12A.

CATALOG LISTING CODE

WW

Type

1

Action

K

Circuitry

00

Variations

D

Elec. Rating

-

D8

Termination

Basic Switches

Operating Characteristics

ELECTROMECHANICAL SWITCHES

Definitions below explain the meaning of operating characteristics. Characteristics shown in tables throughout catalog were chosen as most significant. They are taken at normal room temperature and humidity. These may vary as temperature and humidity conditions differ. Sketches show how characteristics are measured for in-line plunger actuation.

Linear dimensions for in-line actuation are from top of plunger to a reference line, usually the center of the mounting holes.

Differential Travel (D.T.)—Plunger or actuator travel from point where contacts “snap-over” to point where they “snap-back.”

Free Position (F.P.)—Position of switch plunger or actuator when no external force is applied (other than gravity).

Full Overtravel Force—Force required to attain full overtravel of actuator.

Operating Position (O.P.)—Position of switch plunger or actuator at which point contacts snap from normal to operated position. Note that in the case of flexible or adjustable actuators, the operating position is measured from the end of the lever or its maximum length. Location of operating position measurement shown on mounting dimension drawings.

Operating Force (O.F.)—Amount of force applied to switch plunger or actuator to cause contact “snap-over.” Note in the case of adjustable actuators, the force is measured from the maximum length position of the lever.

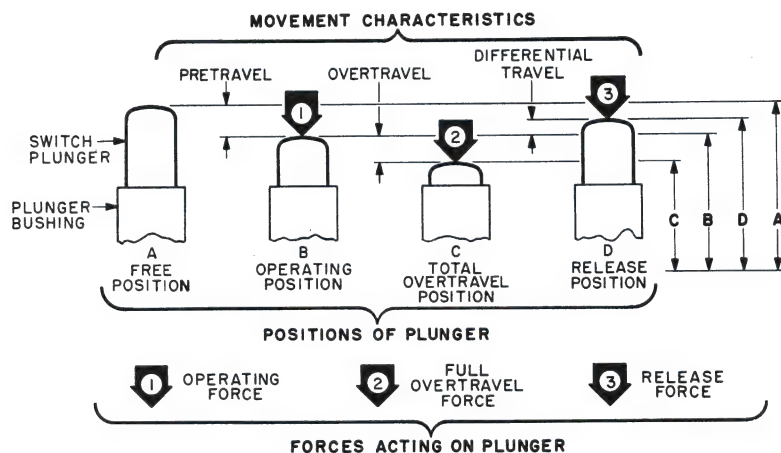
Overtravel (O.T.)—Plunger or actuator travel safely available beyond operating position.

Pretravel (P.T.)—Distance or angle traveled in moving plunger or actuator from free position to operating position.

Release Force (R.F.)—Amount of force still applied to switch plunger or actuator at moment contacts snap from operated position to unoperated position.

Total Travel (T.T.)—Distance from actuator free position to overtravel limit position.

IN-LINE PLUNGER ACTUATION



Basic Switches

Operating Characteristics

FULL LOAD AND LOCKED ROTOR CURRENTS FOR SINGLE PHASE AND DC MOTORS

| HP | Alternating Current | | | | Direct Current | | | |
|------|---------------------|--------------|-----------|--------------|----------------|--------------|-----------|--------------|
| | 115 Volts | | 230 Volts | | 115 Volts | | 230 Volts | |
| | Full Load | Locked Rotor | Full Load | Locked Rotor | Full Load | Locked Rotor | Full Load | Locked Rotor |
| 2 | 24.0 | 144.0 | 12.0 | 72.0 | 17.0 | 170.0 | 8.5 | 85.0 |
| 1½ | 20.0 | 120.0 | 10.0 | 60.0 | 13.2 | 132.0 | 6.6 | 66.0 |
| 1 | 16.0 | 96.0 | 8.0 | 48.0 | 9.6 | 96.0 | 4.8 | 48.0 |
| ¾ | 13.8 | 82.8 | 6.9 | 41.4 | 7.4 | 74.0 | 3.7 | 37.0 |
| ½ | 9.8 | 58.8 | 4.9 | 29.4 | 5.4 | 54.0 | 2.7 | 27.0 |
| ⅓ | 7.2 | 43.2 | 3.6 | 21.6 | 3.8 | 38.0 | 1.9 | 19.0 |
| ¼ | 5.8 | 34.8 | 2.9 | 17.4 | 3.0 | 30.0 | 1.5 | 15.0 |
| ⅙ | 4.4 | 26.4 | 2.2 | 13.2 | 2.4 | 24.0 | 1.2 | 12.0 |
| ⅛ | 3.8 | 22.8 | 1.9 | 11.4 | 2.2 | 22.0 | 1.1 | 11.0 |
| 1/10 | 3.0 | 18.0 | 1.5 | 9.0 | 2.0 | 20.0 | 1.0 | 10.0 |
| 1/20 | 1.5 | 9.0 | — | — | — | — | — | — |

Basic Switches

B Type Switches Performance Information

ELECTRICAL DATA CHART

| Catalog Listing (contact gap) | Voltage | Amperes | | | | | | | | | |
|--------------------------------|---------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-------------|
| | | Current Carrying Capacity Max. ¹ | Resistive | Inrush | | Motor | | Lamp | | Inductive ² | |
| | | | | N.C. Ckt. | N.O. Ckt. | N.C. Ckt. | N.O. Ckt. | N.C. Ckt. | N.O. Ckt. | Sea Level | 50,000 Feet |
| BZ-3YT* .036 in. 0,91 mm | VDC | | | | | | | | | | |
| | 8 | 5 | 10 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 10 |
| | 14 | 5 | 10 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 10 |
| | 30 | 5 | 10 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 5 |
| | 125 | 5 | 1 | 10 | 10 | 2 | 2 | 1 | 1 | 0.6 | 0.4 |
| | 250 | 5 | 0.6 | 6 | 6 | 1.2 | 1.2 | 0.6 | 0.6 | 0.4 | 0.3 |
| BZ-3YT* .036 in. 0,91 mm | VAC | | | | | | | | | | |
| | 120 | 5 | 5 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 5 |
| | 240 | 5 | 5 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 5 |
| | 277 | 5 | 5 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 5 |
| BM-2R .020 in. 0,50 mm | VDC | | | | | | | | | | |
| | 8 | 22 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 8 | 7 |
| | 14 | 22 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 5 |
| | 30 | 22 | 2 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 1 | 1 |
| | 125 | 22 | 0.4 | 4 | 4 | 0.8 | 0.4 | 0.4 | 0.4 | .03 | .02 |
| | 230 | 22 | 0.2 | 2 | 2 | 0.4 | 0.2 | 0.2 | 0.2 | .02 | .01 |
| BM-2R .020 in. 0,50 mm | VAC | | | | | | | | | | |
| | 125 | 22 | 22 | 35 | 20 | 5.8 | 3.4 | 3.5 | 2.0 | 22 | 22 |
| | 250 | 22 | 22 | 35 | 20 | 5.8 | 3.4 | 3.5 | 2.0 | 22 | 22 |
| | 277 | 22 | 22 | 35 | 20 | 5.8 | 3.4 | 3.5 | 2.0 | 22 | 22 |
| | 460 | 22 | 22 | 35 | 20 | 5.8 | 3.4 | 3.5 | 2.0 | 22 | 22 |
| BA-2R .020 in. 0,50 mm | VDC | | | | | | | | | | |
| | 8 | 20 | 20 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 14 | 20 | 20 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 8 |
| | 30 | 20 | 5 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 2 |
| | 125 | 20 | 0.5 | 4 | 4 | 0.8 | 0.4 | 0.4 | 0.4 | .05 | .03 |
| | 230 | 20 | 0.25 | 2 | 2 | 0.4 | 0.2 | 0.2 | 0.2 | .03 | .02 |
| BA-2R .020 in. 0,50 mm | VAC | | | | | | | | | | |
| | 120 | 20 | 20 | 75 | 75 | 12.5 | 12.5 | 7.5 | 7.5 | 20 | 20 |
| | 240 | 20 | 20 | 75 | 75 | 12.5 | 12.5 | 7.5 | 7.5 | 20 | 20 |
| | 277 | 20 | 20 | 75 | 75 | 12.5 | 12.5 | 7.5 | 7.5 | 20 | 20 |
| | 460 | 20 | 20 | 75 | 75 | 12.5 | 12.5 | 7.5 | 7.5 | 20 | 20 |
| BE-2R .020 in. 0,50 mm | VDC | | | | | | | | | | |
| | 8 | 25 | 25 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 14 | 25 | 25 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 8 |
| | 30 | 25 | 5 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 2 |
| | 125 | 25 | 0.5 | 4 | 4 | 0.8 | 0.8 | 0.4 | 0.4 | .05 | .03 |
| | 250 | 25 | 0.25 | 2 | 2 | 0.4 | 0.4 | 0.2 | 0.2 | .03 | .02 |
| BE-2R .020 in. 0,50 mm | VAC | | | | | | | | | | |
| | 120 | 25 | 25 | 96 | 96 | 16 | 16 | 10 | 10 | 25 | |
| | 240 | 25 | 25 | 96 | 96 | 16 | 16 | 10 | 10 | 25 | |
| | 277 | 25 | 25 | 96 | 96 | 16 | 16 | 10 | 10 | 25 | |
| | 460 | 25 | 25 | 96 | 96 | 16 | 16 | 10 | 10 | 25 | |
| BZ-R .006 in. 0,15 mm | VAC | | | | | | | | | | |
| | 125 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 250 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 277 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| BZ-1R .010 in. 0,25 mm | VDC | | | | | | | | | | |
| | 8 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 8 | 7 |
| | 14 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 5 |
| | 30 | 15 | 2 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 1 | 1 |
| | 125 | 15 | 0.4 | 4 | 4 | 0.8 | 0.8 | 0.4 | 0.4 | 0.03 | 0.01 |
| | 230 | 15 | 0.2 | 2 | 2 | 0.4 | 0.4 | 0.2 | 0.2 | 0.02 | 0.01 |
| BZ-1R .010 in. 0,25 mm | VAC | | | | | | | | | | |
| | 125 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 250 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 277 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 460 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |

* Ampere levels for BZ-3YT applicable **only** if common terminal is not used and switch is used as a shorting bar switch.

Basic Switches

B Type Switches Performance Information

ELECTRICAL DATA CHART, cont.

| Catalog Listing (contact gap) | Voltage | Amperes | | | | | | | | | |
|-------------------------------|---------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-------------|
| | | Current Carrying Capacity Max. ¹ | Resistive | Inrush | | Motor | | Lamp | | Inductive ² | |
| | | | | N.C. Ckt. | N.O. Ckt. | N.C. Ckt. | N.O. Ckt. | N.C. Ckt. | N.O. Ckt. | Sea Level | 50,000 Feet |
| BZ-2R .020 in. 0.50 mm | VDC | | | | | | | | | | |
| | 8 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 14 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 8 |
| | 30 | 15 | 6 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 5 | 2 |
| | 125 | 15 | 0.4 | 4 | 4 | 0.8 | 0.8 | 0.4 | 0.4 | 0.05 | 0.03 |
| | 230 | 15 | 0.2 | 2 | 2 | 0.4 | 0.4 | 0.2 | 0.2 | 0.03 | 0.02 |
| BZ-2R .020 in. 0.50 mm | VAC | | | | | | | | | | |
| | 125 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 250 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 277 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 460 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| BZ-3R .036 in. 0.91 mm | VDC | | | | | | | | | | |
| | 8 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 14 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 30 | 15 | 10 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 5 |
| | 125 | 15 | 0.6 | 6 | 6 | 1.2 | 1.2 | 0.6 | 0.6 | 0.1 | 0.05 |
| | 250 | 15 | 0.3 | 3 | 3 | 0.6 | 0.6 | 0.3 | 0.3 | 0.05 | 0.03 |
| BZ-3R .036 in. 0.91 mm | VAC | | | | | | | | | | |
| | 125 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 250 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 277 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 460 | 15 | 15 | 30 | 15 | 4 | 2.5 | 3 | 1.5 | 15 | 15 |
| BZ-7R .070 in. 1.78 mm | VDC | | | | | | | | | | |
| | 8 | 30 | 15 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 | — |
| | 14 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 30 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 10 | 7.5 |
| | 125 | 15 | 0.75 | 7.5 | 7.5 | 1.5 | 1.5 | 0.75 | 0.75 | 0.4 | 0.2 |
| | 250 | 15 | 0.3 | 3 | 3 | 0.6 | 0.6 | 0.3 | 0.3 | 0.2 | 0.1 |
| BZ-7R .070 in. 1.78 mm | VAC | | | | | | | | | | |
| | 120 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 240 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 277 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |
| | 460 | 15 | 15 | 30 | 15 | 5 | 2.5 | 3 | 1.5 | 15 | 15 |

1 For a 86 – F (30 – C) max. temperature rise at terminals, not opening or closing the load (at sea level).

2 Data established with a 75% power factor on AC loads.

TEST CONDITIONS

Switch contact life is affected by electrical conditions and other factors, such as: temperature, humidity, airborne contamination, vibration, amount and rate of plunger travel, and cycling

rate. Our Evaluation Laboratory tests are conducted using procedures and practices common to UL and Military Specifications. The following conditions generally apply.

| | |
|--------------------|--|
| Temperature: | Room Ambient (70 – F, 21 – C). |
| Humidity: | Room Ambient (50%). |
| AC Cycle Rate: | 60 operations/minute. |
| DC Cycle Rate: | 20 operations/minute. |
| On-off Time: | Equal and compatible with above cycling rates. |
| Power Factor (AC): | Approximately 75%. |
| Inductance (DC): | MIL-I-81023 Inductor. |
| Circuit Loading: | One throw only on a SPDT switch during any test procedure. Both throws are evaluated separately. |
| Travel Plunger: | Full switch travel is used. |
| Actuation: | Linear motion. |
| Overtravel Force: | 1 to 3 lbs. from spring-loaded actuators. |

MICRO SWITCH believes that with the following voltage and current values and under the test conditions set forth below switch life of 100,000 closures, 95% survival can be expected. It is a starting point for user evaluation and provides guidelines on the switches identified. Because of the numerous electrical conditions listed, not every current and voltage level has actually been tested on every switch and certain figures have

been extrapolated. For specific switch selection, customers should evaluate switches under actual application conditions or by simulating all application conditions and requirements. The information set forth cannot substitute for the customer's own product evaluation. It should never be published by a customer as a rating on their product.

Basic Switches

Definitions of Terms

Actuator – Mechanism of the switch or switch enclosure which operates the contacts.

Auxiliary Actuator – A mechanism, sold separately, to provide basic switches with easier means of operation and adjustment and adapt switches to different operating motions by supplying supplemental overtravel.

Basic Switch – A self-contained switching unit. It can be used alone, gang-mounted, built into assemblies or enclosed in metal housings.

Bifurcated Contacts – A movable contact, generally gold plated, which is forked to provide two contact mating surfaces in a parallel, for more reliable contact.

Break – To open an electrical circuit.

Break Distance – The minimum open gap distance between stationary and movable objects.

Characteristics – This term is used by MICRO SWITCH in a restricted sense and refers only to switch operating characteristics such as pretravel, operating force, etc.

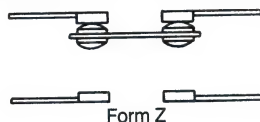
Circuit – The contact arrangement with switch actuator and contacts in their normal position.

Dead break – Exists in all mechanical switches. Definition: When the switch plunger is being depressed, dead break is non-contact immediately before the plunger reaches the operating point. When the switch plunger is being released, dead break is non-contact immediately before the plunger reaches the release point. Dead break is expressed in distance of plunger travel during which the non-contact occurs. Manufacturing specifications for most BZ/BA basic switches allow a maximum dead break of 0.00005 in. (0.001 mm) measured at the switch plunger. Switches are evaluated while moving the plunger with the switch installed in a 10 VDC, 0.100 ampere circuit. This specification does not apply to switches that have been in service or have not received proper handling or storage. For applications sensitive to dead break, call Freeport for information on applicable electrical and mechanical conditions.

Dead make – When the switch plunger is being depressed, dead make is non-contact immediately after the plunger reaches the release point. Dead make is expressed as the distance of plunger travel during which the non-contact occurs.

Non contact is a failure of open contacts to close (that is, the switch resistance exceeds the specified value) within the specified range of plunger positions. If a plunger position is specified with respect to time, a non-contact is a contact miss.

Double Break Contacts – (Twin break). This breaks the circuit in two places. Referred to as form Z circuitry also.



Double-Pole Double-Throw (DPDT) – Switches which make and break two separate circuits. This circuit provides a normally open and normally closed contact for each pole.

Enclosed Switch – A basic switch unit (contact block) enclosed in a durable metal housing. The enclosure protects the switching unit, provides mounting means, and fitting for conduit connection.

Environment-Proof Switch – A switch which is completely sealed to ensure constant operating characteristics. Sealing normally includes an "O" ring on actuator shaft and fused glass-to-metal terminal seals or complete potting and an elastomer plunger-case seal.

Explosion-Proof Switch – A UL listed switch capable of withstanding an internal explosion of a specified gas without igniting surrounding gases.

Hermetically Sealed Switch – A switch completely sealed to provide constant operating characteristics. All junctures made with metal-to-metal or glass-to-metal fusion.

Magnetic Blow-Out Switch – Contains a small permanent magnet which provides a means of switching high d-c loads. The magnet deflects arc to quench it.

Maintained Contact Switch – Designed for applications requiring sustained contact after plunger has been released, but with provision for resetting.

Make – To close or establish an electrical circuit.

Momentary Switch – A switch with contacts that return from operated condition to normal condition when actuating force is removed. Unless otherwise stated, all switches in this catalog are momentary.

Mounting Dimensions – All dimensions on the mounting dimension drawings in this catalog are subject to change without notice. Request current drawings from the nearest MICRO SWITCH Sales Office or write to Freeport.

Normally Closed Contacts (N.C.) – Provide a normally closed circuit when actuator is in free position.

Normally Open Contacts (N.O.) – Provide a normally open circuit when actuator is in free position.

Precision Snap-Acting Switch – An electromechanical switch having predetermined and accurately controlled characteristics, and having a spring loaded quick make and break contact action.

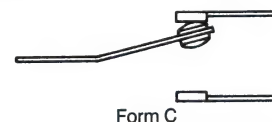
Projection Contacts – A design in which one or more truncated projections are arranged on the stationary contacts. When closed on the smooth, spherical surface of the opposing contact this configuration tends to break thru oxides and other film contaminants to avoid the particulate contaminants. Used with silver contacts, this design can be a useful substitute for the more expensive gold or gold alloy contact material.

Pulse Switch – Provides a single pulse of current for each cycle of operation.

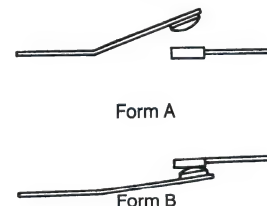
Quick Connect Terminal – A plug-in type terminal designed for quick switch wiring.

Repeatability – Ability of a switch to repeat its characteristics precisely from one operation to the next operation.

Single-Pole Double-Throw (SPDT) – Switch which may either make or break a circuit, depending on how it is wired. Also referred to as form C circuitry.



Single-Pole Single-Throw (SPST) – Switch with only one moving and one stationary contact. Available either normally open (N.O.) also referred to as form A circuitry; or normally closed (N.C.) also referred to as form B circuitry.



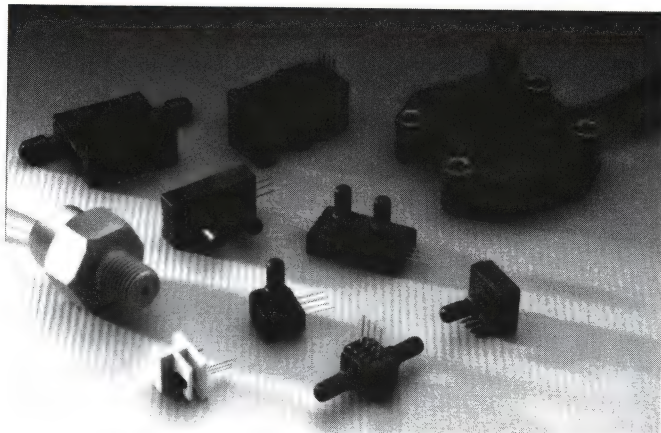
Terminal Enclosure – A housing that fits over switch terminals to protect against electrical shock and accidental shorting, and facilitate wiring.

Two Circuit Switch – In one position, moving contacts complete one circuit, in the other position, contacts complete another separate circuit.

Other MICRO SWITCH Product Catalogs

Honeywell MICRO SWITCH Division's reputation as an innovator in the design and manufacture of quality position sensing and manual control products spans 40 years. Shown is a cross-section of the many varieties. This broad selection offers a wide range of technologies, sizes, actuation means, circuitries, elec-

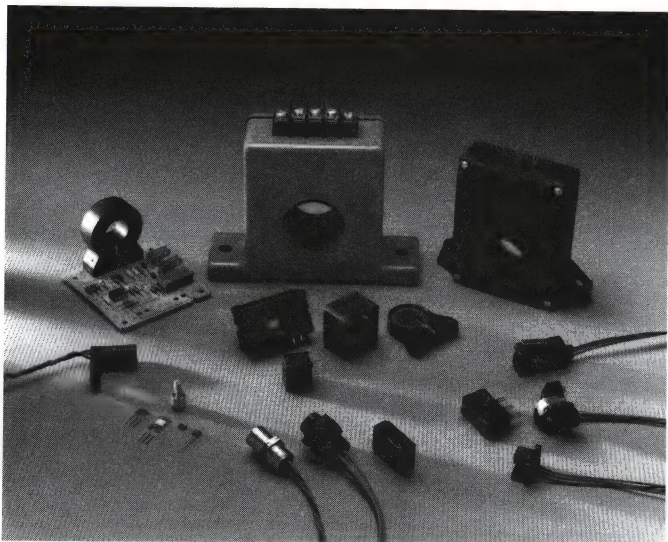
trical capacities, and terminations, for in-plant and original equipment needs. Contact your nearest MICRO SWITCH Sales Office or Authorized Distributor for complete catalog information. For direct assistance, contact MICRO SWITCH, Freeport, IL 61032, or phone 1-800-537-6945.



SOLID STATE PRESSURE SENSORS

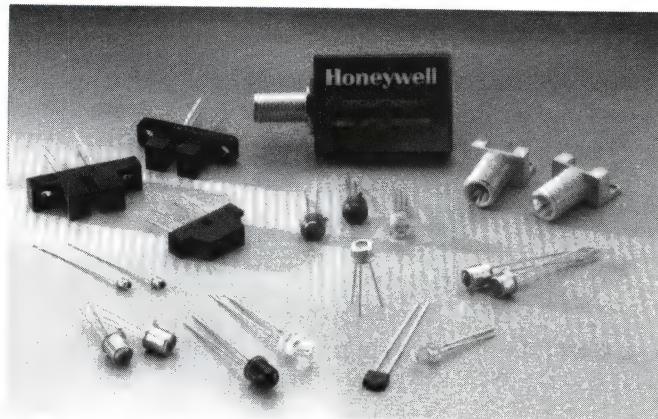
MICRO SWITCH pressure sensors are small, low cost and reliable. They feature excellent repeatability, high accuracy, and reliability under varying environmental conditions. In addition, they feature highly consistent operating characteristics from one sensor to the next and interchangeability without recalibration.

MICRO SWITCH offers four pressure sensor measurement types — absolute, differential, gage, and vacuum gage and pressure ranges from $\pm 5''\text{H}_2\text{O}$ to 250 psi. **Catalog 15.**



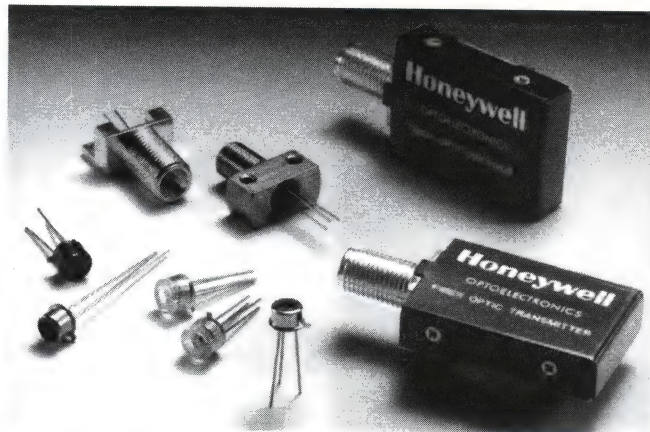
SOLID STATE SENSORS

Hall effect position and vane sensors, metal detecting proximity sensors, and current sensors are available in various sizes and terminations. Reliability, high speed, long life and direct compatibility with other electronic circuitry combine to provide the solutions to your solid state sensor needs. **Catalog 20.**



INFRARED PRODUCTS

Optoelectronics is the integration of optical principles and semiconductor electronics. Optoelectronic components are reliable, cost effective sensors. Standard infrared emitting diodes (IREDs), sensors and assemblies are covered. **Request Infrared literature.**



FIBER OPTIC LAN PRODUCTS

The Fiber Optics group specializes in the design, development and manufacture of active optoelectronic components and sub-assemblies for the short-haul fiber optic datacom market. Active fiber optic products are compatible with the majority of standard multimode fiber optic connectors and cables now available in industry.

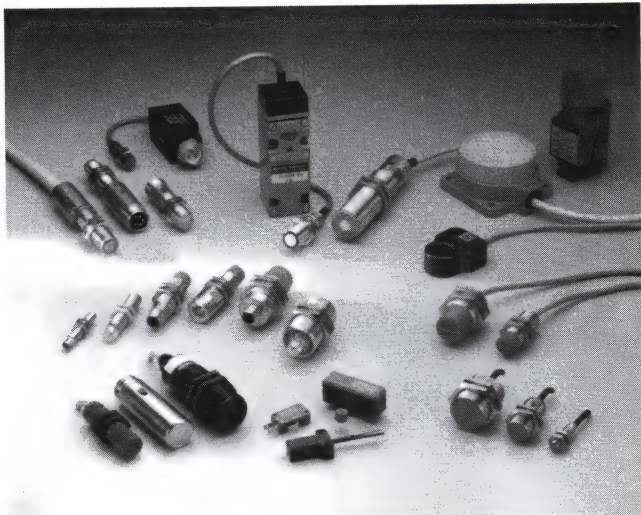
Custom fiber optic products are also available. They are standard products with special testing, selection, documentation and/or minor physical changes to meet special requirements. New innovative products are constantly in development. **Request Fiber Optic LAN literature.**

Other MICRO SWITCH products



LIMIT AND ENCLOSED SWITCHES

MICRO SWITCH offers the world's most advanced line of heavy duty limit switches and a wide selection of application proven enclosed switches (precision snap-acting switches sealed in rugged metal housing). Sealed versions keep out moisture and other contaminants. Explosion-proof types are designed for use in hazardous locations. **Industrial Catalog.**



PROXIMITY SENSORS

Proximity sensors detect the presence of metals or react to a magnetic field. Cylindrical, canister, and limit switch style housings provide application versatility. Their high speed operation keeps pace with production. Models are available for operation at AC line voltage or wide range VDC. Optional LED indicators signal on-off condition. **Industrial Catalog.**

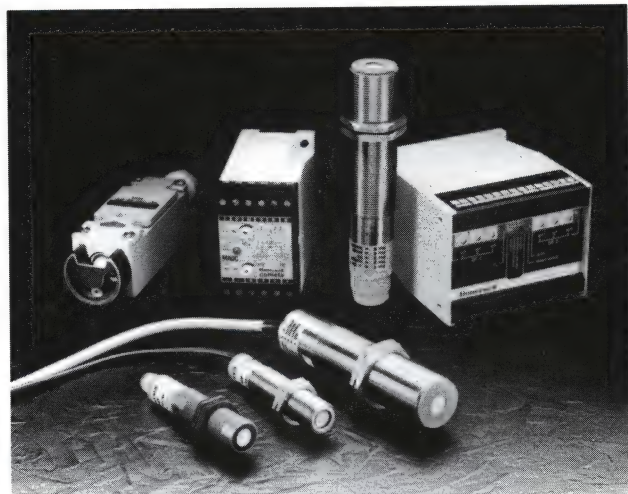
PHOTOELECTRIC SENSORS

MICRO SWITCH has a complete offering of modulated LED and incandescent controls. These devices detect opaque or translucent material at long or short range. Single unit retroreflective and separate emitter/receiver styles fill a variety of application requirements. High intensity models penetrate foggy, dusty, and other poor visibility conditions. Scanning capability ranges from a fraction of an inch to hundreds of feet. **Industrial Catalog**



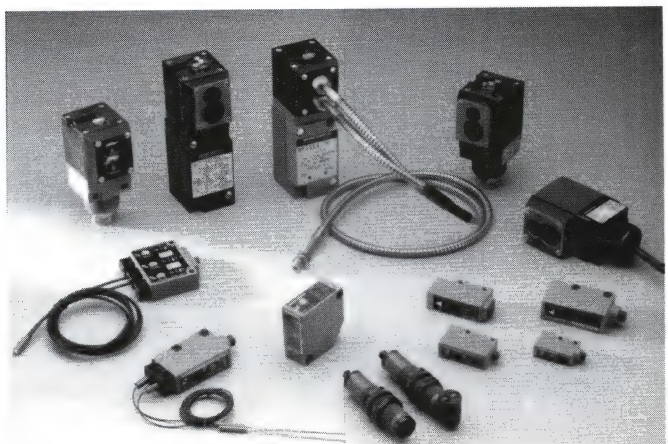
LINE ARRAY/COLOR/SAFETY SENSORS

Precision edge/width sensors meet exacting requirements for precision, high-speed position and distance measurement. Object recognition sensors scan parts and compare their images with reference images preset in sensor memory. Color sensors can be trained to recognize 8 different colors or shades - online - at up to 5000 parts per minute. Safety light curtains are machine guarding devices which meet OSHA and ANSI, as well as many European certifications. **Industrial Catalog.**

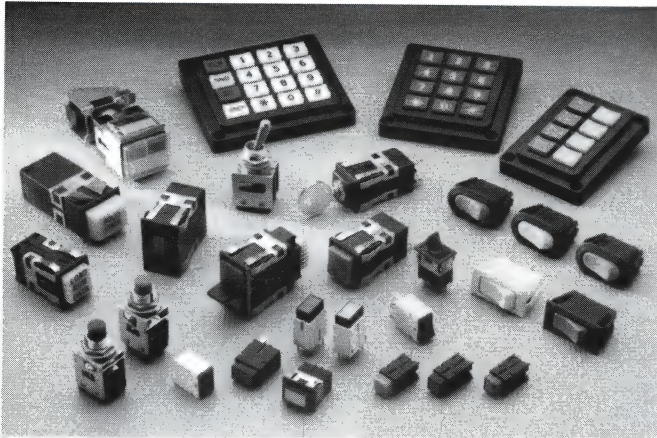


ULTRASONIC PRECISION PROXIMITY SENSORS

Ultrasonic position sensors solve tough sensing problems, detecting targets made of practically any material. They work in dry, dusty environments. **Industrial Catalog.**

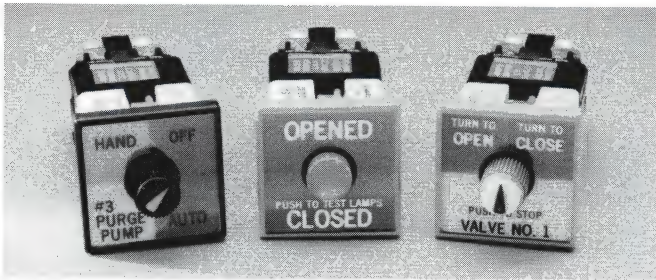


Other MICRO SWITCH products



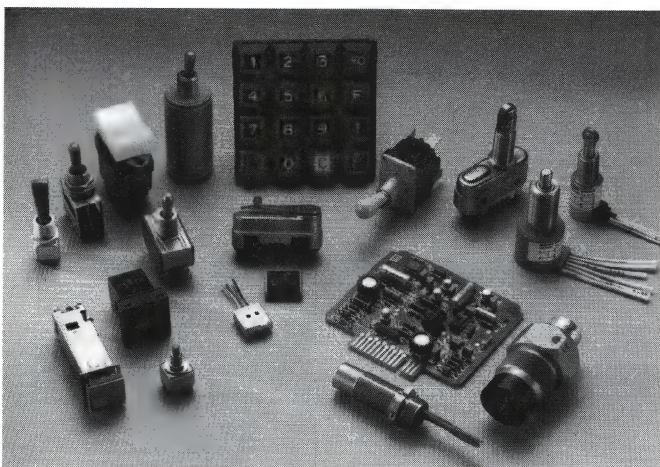
MANUAL CONTROL SWITCHES

Whether you're prototyping a new design or planning to face-lift an existing panel, you'll benefit by considering the wide selection of pushbuttons, indicators, toggles, rockers, paddles, rotary selectors and interlock switches available from MICRO SWITCH. Developed with adherence to good human factors principles, these products aid the designer by offering almost limitless options in visual display techniques, operators, and arrangement of components. Many are military qualified. **Catalog 30.**



MULTI-LIGHT OILTIGHT CONTROLS

Featuring the contemporary square appearance and lighted display, the CMC family offers a wide selection of industrial pushbuttons, selectors and indicators. Contact blocks include heavy duty, standard or electronic duty, plus the four plunger adapter kit to use all four points on the cam. **CMC Catalog.**



AEROSPACE COMPONENTS

Rugged, high performance designs; environment-proof or hermetically sealed. A complete selection includes miniature limit switches, miniature and standard size basic switches, sealed, toggle switches and the highest quality lighted pushbuttons. **Catalog 80.**



SMART DISTRIBUTED SYSTEM

The Smart Distributed System is a bus system for intelligent sensors and actuators that streamlines the system installation process and empowers your inputs and outputs to operate at levels you never thought possible. Over a single 4-wire cable, Smart Distributed System can interface up to 126 individually addressable devices. These intelligent sensor and actuator devices do much, much more than just turn on and off.

SYSTEM DIAGNOSTICS

The Smart Distributed System is based on the CAN Protocol. CAN is a full function network protocol that provides both message checking and correction to insure communication integrity.

DEVICE DIAGNOSTICS

Many of the Smart Distributed System devices have special diagnostics designed into them. For instance, some of the photoelectric controls can send warning messages if their lenses get dirty or they are out of alignment. Other diagnostics will be coming in the future.

DEVICE FUNCTIONS

All Smart Distributed System devices are intelligent and can be setup, via the Activator or PC base control programs, to perform high-level functions that non-System devices simply cannot do. Using the System device functions you can off-load rudimentary control functions to the devices, allowing the host to concentrate on errors if they occur. Smart Distributed System device functions include:

- Normally-open or normally-closed (switches and sensors)
- Light operate or dark operate (photoelectric controls)
- On-delay
- Off-delay
- Motion or jam detection
- Batch counter
- Number of operations count
- Number of power cycles count

TRULY OPEN DISTRIBUTED MACHINE CONTROL

The Smart Distributed System is uniquely and completely open. It works with the PLC or PC control device of your choice. That makes the Smart Distributed System completely compatible with your present control system or whatever control system you have in mind for the future. In fact, no other distributed machine control system offers as much flexibility or growth potential. The Smart Distributed System protocol will even accommodate peer-to-peer communication.

MORE DEVICE SELECTION FOR GREATER FLEXIBILITY

Many manufacturers of industrial control devices have become part of Smart Distributed System simply by integrating our CAN-based chips or by utilizing off-the-shelf interface devices. The Smart Distributed System can be easily integrated into your control system, allowing you to choose the equipment and manufacturers that best match your application.

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